January 27, 1947

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 35

HNOLOGY DEPARTMENT

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JAN 27 1947

DETROIT

WEAN ENGINEERING COMPANY, INC.

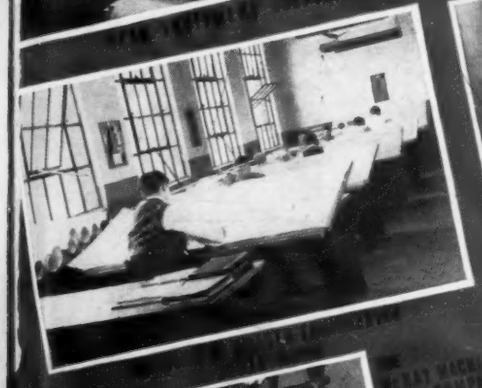
WEAN

ENGINEERING

Company, Inc.

• The combined engineering talents of The Wean Engineering Company, Inc., and its associate companies, form a vast fund of knowledge and experience in the specialized field of designing and building sheet, tin, strip and wire mill equipment.

Wean offers the services of this group of over 150 technicians and engineers, each one a trained specialist in his particular field, to help solve your problems.



SPECIALISTS IN SHEET, TIN & STRIP MILL EQUIPMENT

THE WEAN ENGINEERING CO., INC.
WARREN, OHIO

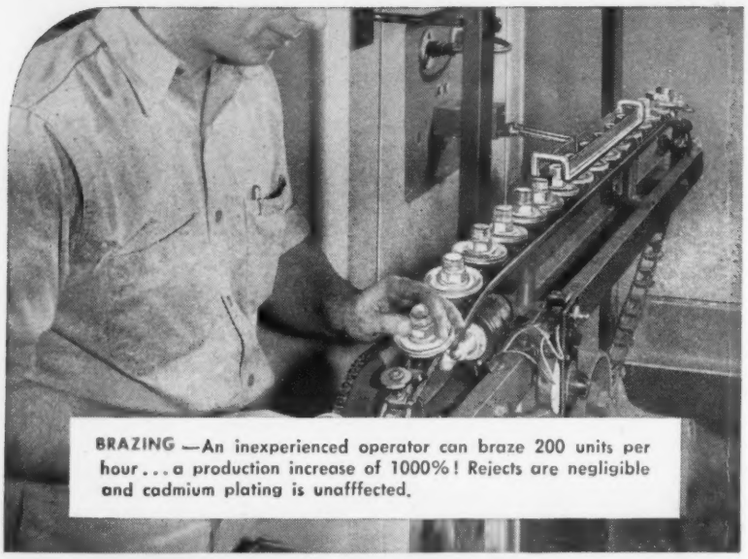
3 Ways

ALLIS-CHALMERS INDUCTION HEATERS STEP-UP PRODUCTION

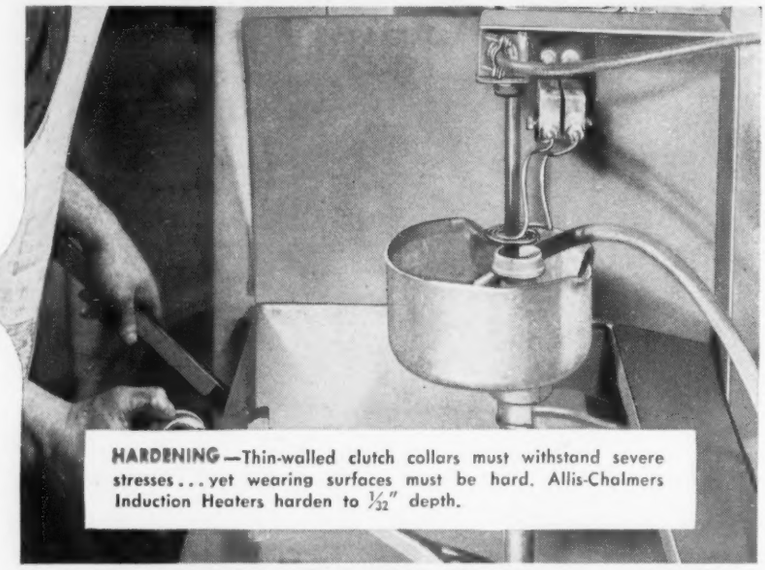
WHY not step up *your* production with Allis-Chalmers Induction Heaters? With electronic heating you can process parts at the push of a button and in most cases cut heating time as much as 85% resulting in big savings of money. One user reports his machine is paying for itself every 50 hours of operation.

This new production tool is safe and and practical . . . simple to operate . . . needs no experienced help. Why not let A-C experts analyze your problem . . . give you careful estimates of per-piece production, and equipment costs. No obligation. Meanwhile, write for your copy of Bulletin 14B6430. ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2150

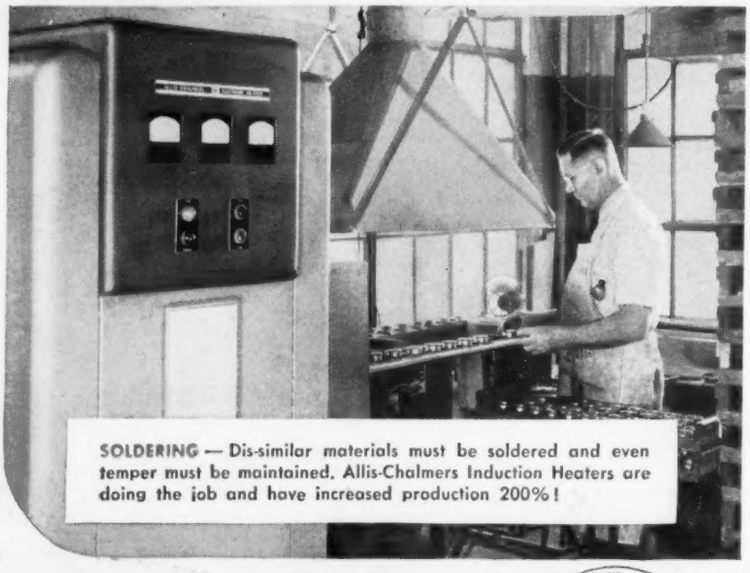
Standard models in ratings of 20 KW, 50 KW, 100 KW. Larger or special ratings upon request.



BRAZING —An inexperienced operator can braze 200 units per hour . . . a production increase of 1000%! Rejects are negligible and cadmium plating is unafffected.



HARDENING —Thin-walled clutch collars must withstand severe stresses . . . yet wearing surfaces must be hard. Allis-Chalmers Induction Heaters harden to 1/32" depth.



SOLDERING — Dis-similar materials must be soldered and even temper must be maintained. Allis-Chalmers Induction Heaters are doing the job and have increased production 200%!

ALLIS·CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947
A CENTURY OF SERVICE to Industry THAT MADE America Great

BETHLEHEM TIN MILL PRODUCTS

meet the varied needs of manufacturers

BETHLEHEM STEEL COMPANY

BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation

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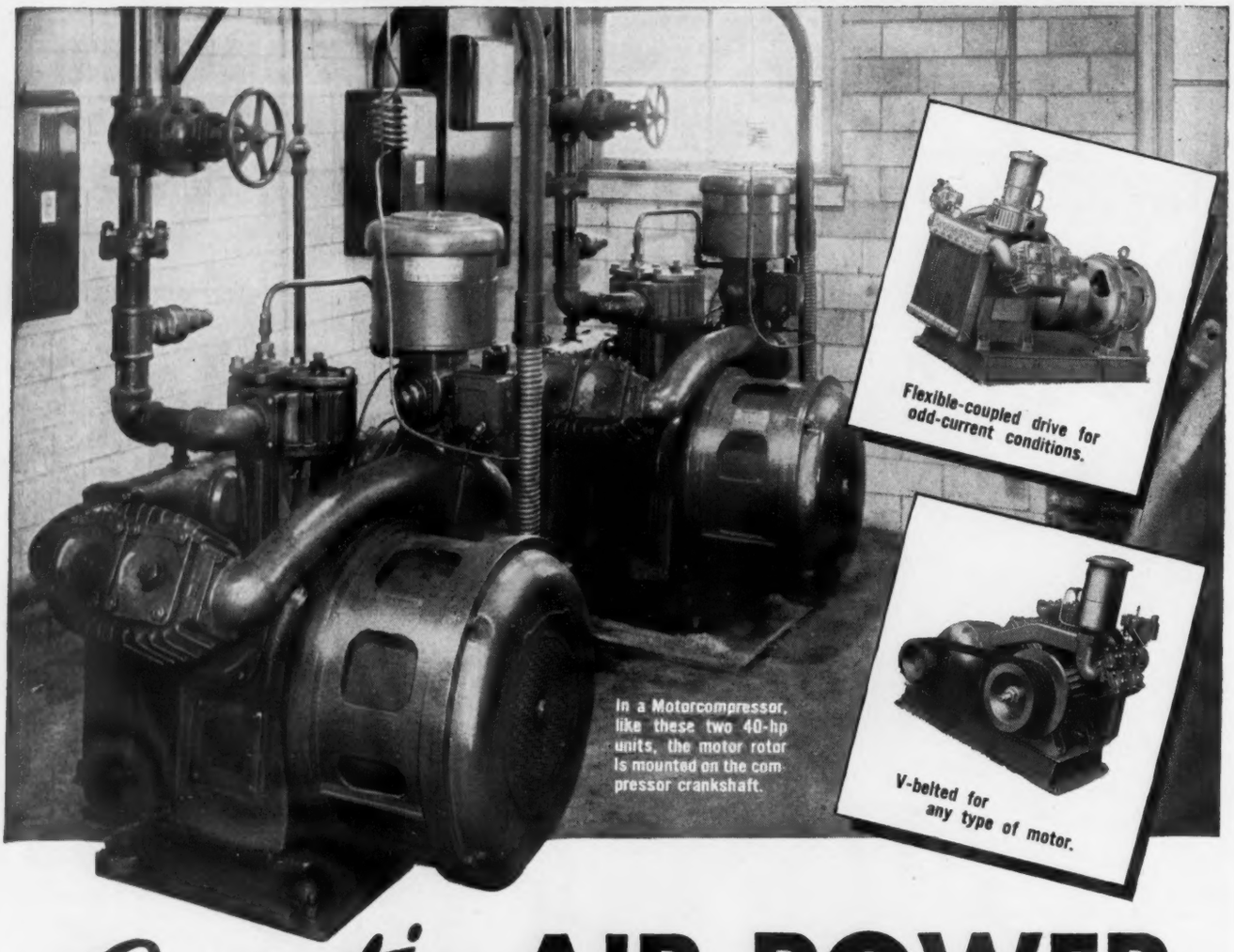
BETHLEHEM STEEL


Flexible-coupled drive for odd-current conditions.
In a Motorcompressor, like these two 40-hp units, the motor rotor is mounted on the compressor crankshaft.
V-belted for any type of motor.

Generating AIR POWER
WITH AIR-COOLED COMPRESSORS

TYPE 40

MOTORCOMPRESSORS

- 7 Sizes from 15 to 90 hp
- Two-Stage Compression
- Completely Air-Cooled
- Efficient Channel Valves
- Compact and Light Weight
- No Special Foundation Needed
- Timken Roller Main Bearings
- Constant-Level Lubrication
- Dual Control for Efficient Regulation under any kind of load.
- Built-in Motor, V-Belt, or Flexible-Coupled Drive.

For sizes ½ to 15 hp, use Ingersoll-Rand Type 30 Air-Cooled Compressors

By using Two-Stage Air-Cooled *Motorcompressors* to generate your Air Power, you eliminate the cost of water, water piping, and the danger of freezing.

These compact, light-weight, and well-balanced compressors require practically no foundation. They are installed, and serviced, easily and quickly.

Where such factors are primary considerations, *Motorcompressors* are ideal for the main air supply... or for supplementing the capacity of your larger compressors during peak loads... or for locations remote from the main compressed-air and water lines. And their efficient two-stage design will save power.

To increase the output of your plant, or to cut over-all production costs, you may need *more* Air-Power. An Ingersoll-Rand engineer can help you select air equipment best suited to *your own requirements*... compressors that generate *lowest-cost* Air Power, and the tools that get the most work out of the Air.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y. 1-771

COMPRESSORS · AIR TOOLS · ROCK DRILLS · TURBO BLOWERS · CONDENSERS · CENTRIFUGAL PUMPS · OIL AND GAS ENGINES

It rides like a cloud— on B.F. Goodrich rubber springs

A typical example of B. F. Goodrich product development

CALIFORNIA bus riders are now enjoying a new kind of velvet-ride comfort on rubber springs in this two-section "articulated" bus, along with such luxuries as lavatories, extra spacious head and leg room, foam rubber seats, and scenery-level windows. The manager of the bus line says this big 40-passenger unit rides better than any other motor vehicle on the road. Here's how it happened:

Years ago, B. F. Goodrich engineers (who believe that *anything* can be improved) had found it possible to absorb shock and vibration in factories by mounting heavy machines on rubber. Why not try to do the same thing for cars and busses with a rubber spring? They did — and came up with the spring that will add more to your riding comfort than anything since the air-filled tire replaced the solid tire years ago.

The spring consists of a metal cylinder filled with rubber, with a shaft in the center — with the rubber firmly bonded to both cylinder and shaft. The weight of the bus connected to the shaft makes it turn inside the cylinder, gives a twisting action to the rubber. Bumps and road shocks are smothered by the twisting rubber *before* they reach the bus frame.

In addition to rubber springs, this new Kaiser Coach is equipped with a lot of other B. F. Goodrich products — tires, Koroseal upholstery and floor covering, Koroseal and metal bellows between sections, and many more; a few of the hundreds of B. F. Goodrich developments that have brought increased comfort, safety and efficiency to the American people and American industry. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

Koroseal—Trade Mark, Reg. U. S. Pat. Off.

B.F. Goodrich

FIRST IN RUBBER

Behind the Scenes...

Nigerian in the Woodpile

We have a small mystery among us, one which has been bothering us for some time. It comes from darkest Africa, and we can't for the life of us figure it out. Every once in a while we get a letter from somebody in Lagos, Nigeria, written in longhand in a sort of backhanded script. We have had a dozen or so of these letters, all from different people and all starting out about the same way, "Having got your name and address from one of my best friends in Lagos, I want you to send me your free sample of your catalogue." They go on to state reasons, usually promising to recommend it to all their friends in Lagos. Some of them go beyond that, one even asking us to bring him over here and train him in "mechanical and engineering," offering to repay any amount after the training. We are much intrigued with these letters, and we wonder just what brought them about and what the various writers really want. Anybody else been receiving correspondence from Lagos?

Hail to the Chief

We note with interest that we have acquired a new character in our pages. He was born with the Yearbook issue, and plans to appear regularly from now on. He's Chief Keokuk, and we picture him here as he looked when admiring himself

in his first appearance. He was dreamed up by an unknown artist on behalf of the Keokuk Electro-Metals Co., and is a direct lineal descendant of the famous Indian peacemaker of many moons ago. He's probably best known as the first half of that famous phrase, "from Keokuk to Kalamazoo," which is supposed to indicate from here to there in America. Personally, we think that's a very limited area, inhabited primarily by radio comedians. Anyhow, we're glad to have the little redskin with us, and we hope it will be many a long moon before he ever bites the dust.

Praises for Price People

This is one of the hottest periods the steel markets have seen for many a long year, what with a complete revolution in prices on almost all the thousands of items we quote back in our market section every week. A big laurel wreath is due to Bill Rooney and his staff for the excellent coverage of these price changes, as well as last-minute, informative articles in the news section on what's happening, what's going to happen, and how it will affect you as a buyer of these products. It's been a big job, and will continue to be a big job until the new price structure has had a chance to simmer a little and the markets become accustomed to new price levels. As usual, STEEL's news and markets staff has done a top-notch job in corralling all the facts and presenting them in a usable way. Their efforts are the real reason why STEEL's coverage of the metal markets is unmatched as a source of vital information.

Q & A Dept.

Seems like the only way we can find out the *right* answers to the problems we have been propounding in this space is to publish the wrong ones. Answers to the coconut problem, for example, are still coming in, still berating us for having the sixth largest answer instead of the smallest. So, now we have to publish an answer to the ladder-and-alley problem, which didn't come with guaranteed answer. We submitted this to a couple of experts, who came out with a couple of answers resulting from a couple of different methods. One of them decided the alley was 26 feet ½-inch wide, and the other claims 22.36+ feet. The latter says his answer is the square root of 500, which doesn't come out even. Maybe you have already doped out a better answer. If so, don't be bashful—we are holding no briefs for our figures. Send it in and we'll print it.

Shrdlu

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STEEL
Vol. 120—No. 4 January 27, 1947

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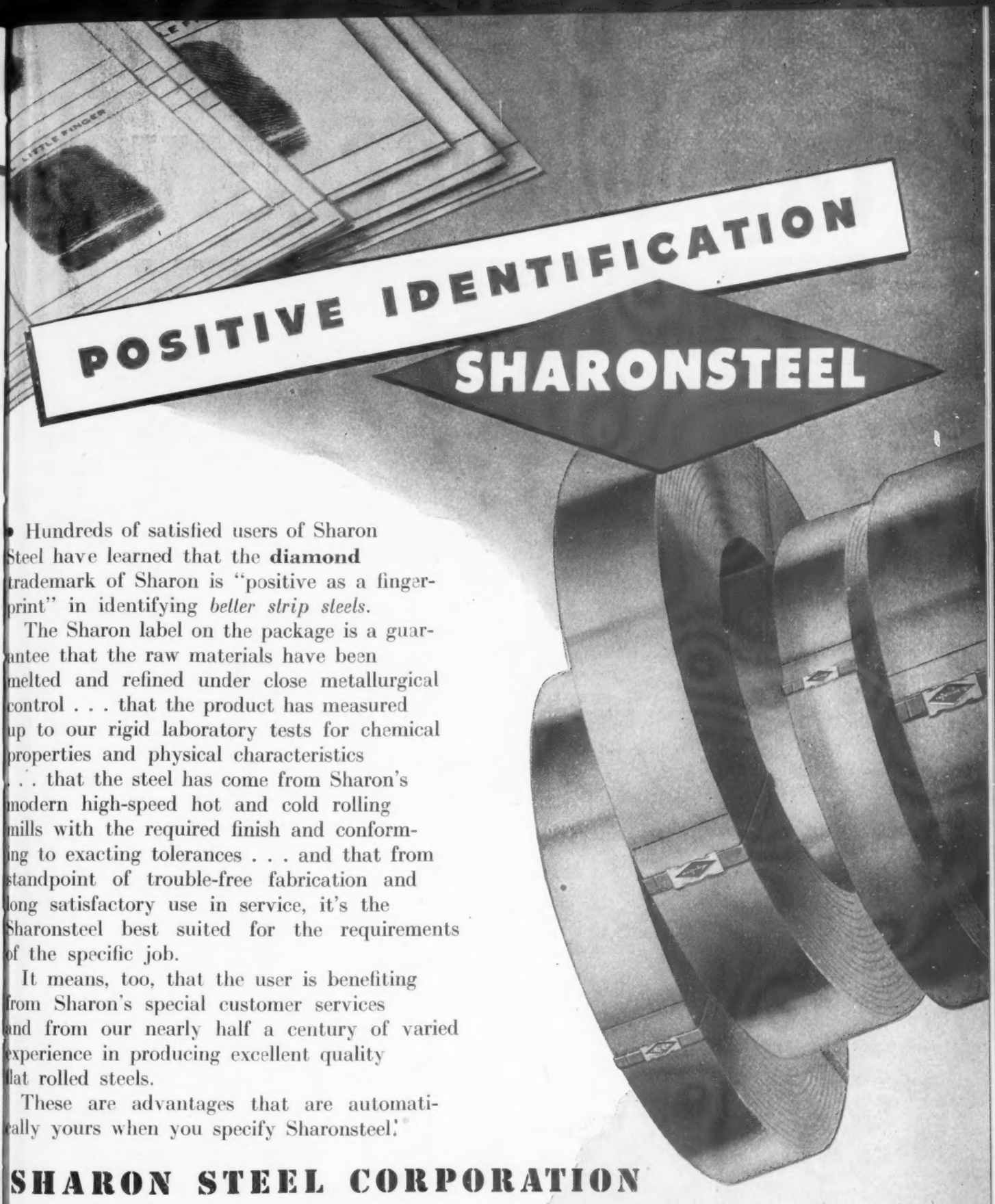

POSITIVE IDENTIFICATION

SHARONSTEEL

• Hundreds of satisfied users of Sharon Steel have learned that the **diamond** trademark of Sharon is "positive as a fingerprint" in identifying *better strip steels.*

The Sharon label on the package is a guarantee that the raw materials have been melted and refined under close metallurgical control . . . that the product has measured up to our rigid laboratory tests for chemical properties and physical characteristics . . . that the steel has come from Sharon's modern high-speed hot and cold rolling mills with the required finish and conforming to exacting tolerances . . . and that from standpoint of trouble-free fabrication and long satisfactory use in service, it's the Sharonsteel best suited for the requirements of the specific job.

It means, too, that the user is benefiting from Sharon's special customer services and from our nearly half a century of varied experience in producing excellent quality flat rolled steels.

These are advantages that are automatically yours when you specify Sharonsteel.

SHARON STEEL CORPORATION

Sharon, Pennsylvania

PRODUCTS OF SHARON STEEL CORPORATION AND SUBSIDIARIES: THE NILES ROLLING MILL COMPANY, NILES, OHIO; DETROIT SEAMLESS STEEL TUBES COMPANY, DETROIT, MICHIGAN; BOPP STEEL CORPORATION, DETROIT, MICHIGAN; BRAINARD STEEL CORPORATION, WARREN, OHIO: Stainless Strip Steel — Hot and Cold Rolled Alloy Steels — High Carbon Steels — Galvanite and Special Coated Products — Cooperage Hoop — Detroit Seamless Steel Tubing — Seamless Steel Tubing in Alloy and Carbon Grades for Mechanical, Pressure and Aircraft Appliances — Electrical Steel Sheets — Hot Rolled Annealed and Deoxidized Steel Sheets — Galvanized Sheets — Enameling Grade Steel — Welded Tubing — Galvanized and Fabricated Strip Steel.

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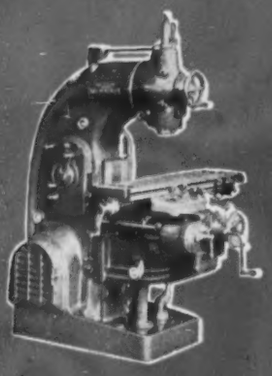
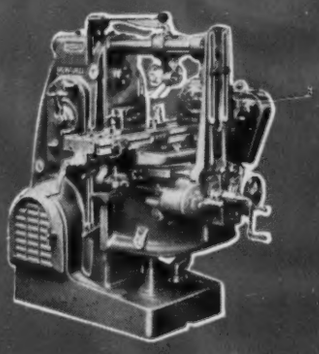
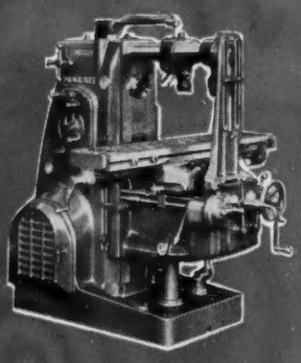


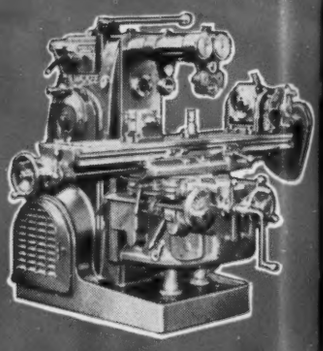
MODEL 1H Swivel Head Vertical —Also available in Plain, Universal, Automatic Cycle Plain and 18" Manufacturing types.



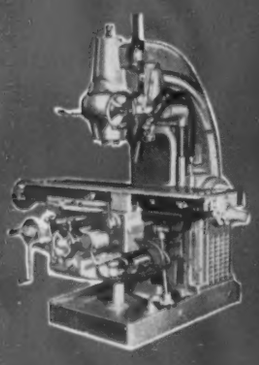
MODEL 2HL Universal — Also available in Plain and Swivel Head Vertical types and in Automatic Cycle Plain type.



MODEL 2H Plain—Also available in Universal and Vertical types and in Automatic Cycle Plain and Vertical types.

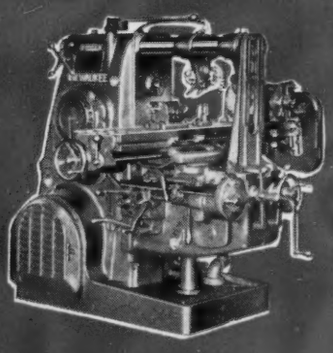


MODEL 3H Universal—Also available in Plain and Vertical types and in Automatic Cycle Plain and Vertical types.

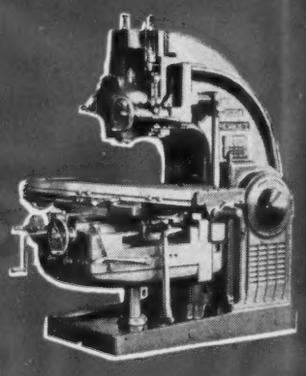


MODEL 2K Vertical Automatic Cycle—Also available in Plain and Vertical types and in Automatic Cycle Plain type.

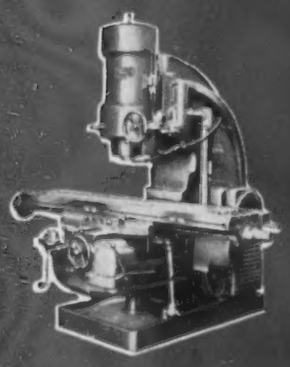
MODEL 3KM Plain—Also available in Universal and Vertical types and in Automatic Cycle Plain and Vertical types.



MODEL 3K Universal—Also available in Plain and Vertical types and in Automatic Cycle Plain and Vertical types.



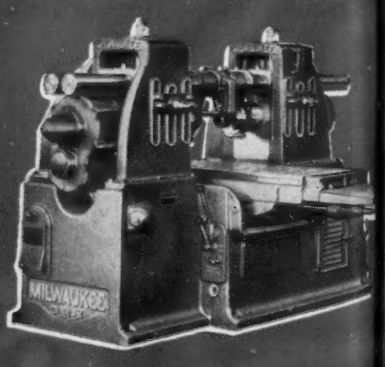
MODEL 4K Vertical—Also available in Plain and Universal types and in Automatic Cycle Plain and Vertical types.



MODEL 50 CSM Vertical — Also available: Plain and Automatic Cycle Plain and Vertical types. Choice of 2 working ranges.

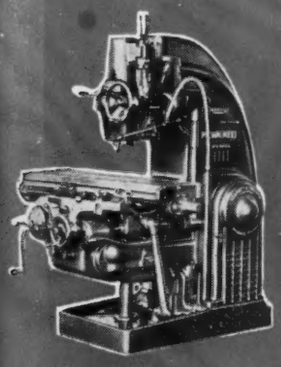
MODEL M-24 Simplex—Available with 18" - 24" or 30" longitudinal travel to table — in Simplex models only.

MODEL 1200 Simplex—Available in both Simplex and Duplex models with 24" - 36" or 48" longitudinal travel to table.

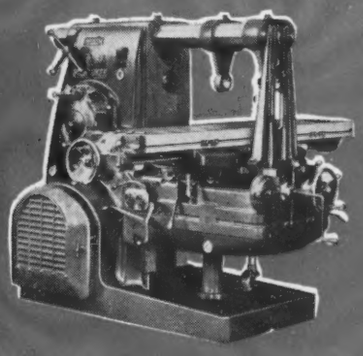


MODEL 1800 Duplex—Available in both Duplex and Simplex models. Choice of 24" - 36" - 48" or 54" longitudinal travel to table.

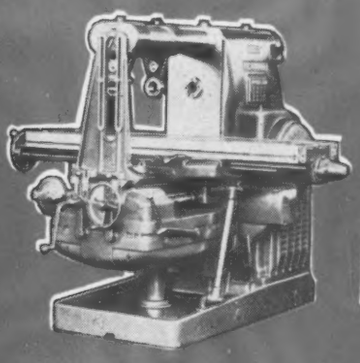
s You Better Buy!



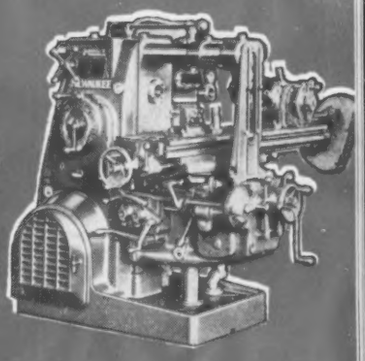
MODEL 4H Vertical—Also available in Plain and Universal types and in Automatic Cycle Plain and Vertical types.



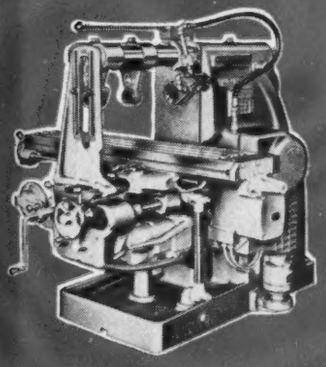
MODEL 5H Plain—Also available in Universal and Vertical types and in Automatic Cycle Plain and Vertical types.



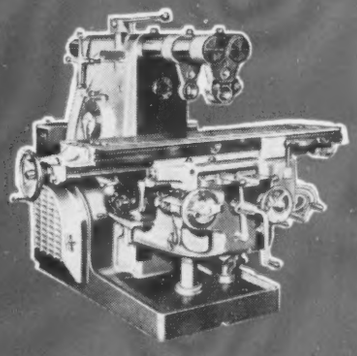
MODEL 5HM Plain—Also available in a Vertical Model machine with identical working ranges as the Plain model.



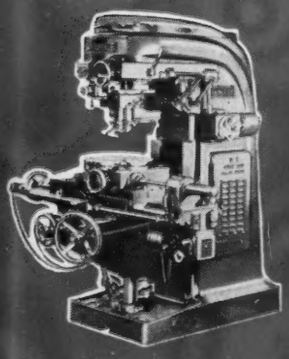
MODEL 2KM Universal — Also available in Plain and Vertical types and in Automatic Cycle Plain and Vertical types.



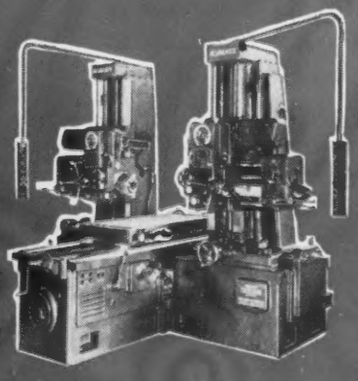
MODEL 20 CSM Plain—Also available in Vertical and Automatic Cycle Plain and Vertical types. Choice of 2 working ranges.



MODEL 30 CSM Plain Automatic Cycle—Also available: Plain, Vertical and Automatic Cycle Vertical types. Choice of 2 working ranges.



MODEL 2D Rotary Head Milling Machine.—One size and working range only. Especially suited to precision tool and die work.



MODEL No. 3TT Precision Milling and Boring Machine—Also available in single column and headstock mpdel — No. 3T.

Kearney & Trecker

Milwaukee Milling Machines — 99 Different Models, Sizes and Types mean the right machine for your job

There's a Kearney & Trecker for every milling job — in small shops, high production plants or precision tool rooms. Horsepowers range from 3 to 50 with wide working ranges and broad feed and speed ranges to suit.

Model K machines are general all-purpose machines. Model H machines are the intermediate type. The new CSMs are the most powerful standard milling machines ever built — specifically designed for carbide milling of steel, but suited for all-purpose work as well. For high speed production you can get the Manufacturing types in conventional, Simplex and Duplex models.

You'll find the Rotary Head Milling Machine and Models No. 3T and 3TT Precision Milling and Boring Machines are ideal for the specialized shop. To meet unusual or special machine requirements, there's Kearney & Trecker Customer Engineering Service where you get the benefit of nearly fifty years experience in precision and production machine tool design and manufacture.

Catalog E-53 gives you complete data on our entire line — Write for it! Please indicate your business connection.

KEARNEY & TRECKER
CORPORATION
Milwaukee 14, Wisconsin

474

Same Job . . .

Same Operator . . .

Same Machine . . .

Same Productive Volume

but

UNIT COST UP 35%

● Thousands of shops face this picture. After reconversion, they are again producing the same parts in the same volume as in the best prewar year. Operators' skill and machine productivity may be fully up to 1939 records.

But accurate surveys of over 2500 metal working plants disclose that today's cost of materials, overhead, and labor are 35% above 1939.

To make up for these higher costs and to maintain a satisfactory margin of profit without resorting to a steep rise in selling price, present management a serious problem.

If your production processes include turning of metal parts, a Warner & Swasey field engineer may be able to help you. After studying your jobs, he probably can recommend improved machines, new tools and methods, or suggest accessories to be added to your old turret lathes to make them more productive.

You can Machine it Better, Faster, for Less...
with a Warner & Swasey

WARNER & SWASEY
Machine Tools
Cleveland

TURRET LATHES, MULTIPLE SPINDLE AUTOMATICS, PRECISION TAPPING & THREADING MACHINES

Designed for SHOCK PROOF ROTARY POWER

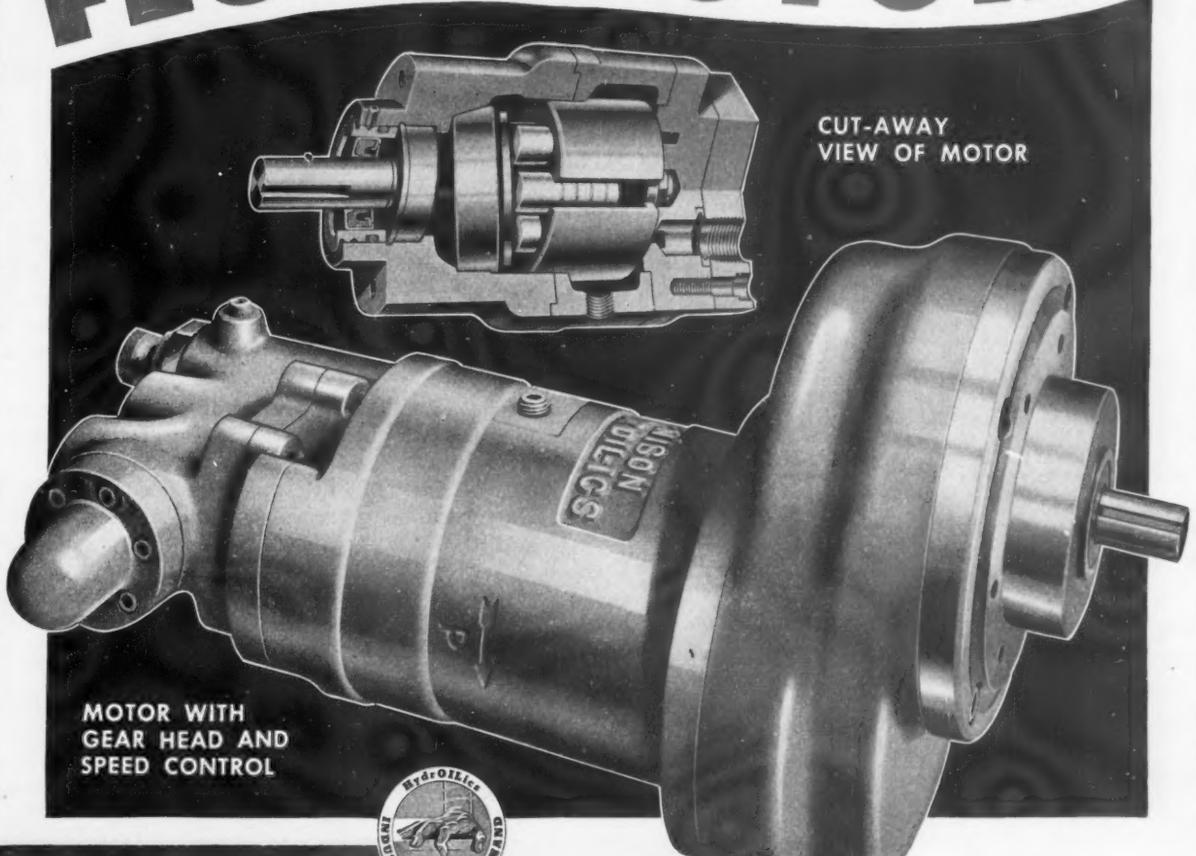
● The "Floating Drive" in these unique motors *eliminates* shock troubles! The punishment and abuse of constant starting, stopping, braking, acceleration and reversal can't damage it! There are no mechanical linkages of any kind between the driving and driven elements—yet the driving element is in *constant pressure* contact with the driven element at all times!

A speed-control valve assembly can be added to permit presetting of the motors at any rpm within their capacity, and gear-head units (as illustrated) are available in a variety of gear ratios. For highest efficiency on rapid-traverse needs, a plunger device built into the speed-control valve permits instant acceleration from any preset speed to full speed. Motors resume preset speeds instantly upon release of the plunger, which may be activated by lever, cam or linkage arrangement.

These motors have no "dead-center" positions—they start instantly when pressure is applied. They are also fully self-lubricating, with or without the gear-head and speed-control assemblies. Available in 3 and 5 hp sizes, with gear heads in 3:1, 1:3, 1.5:1 and 1:1.5 ratios. Write for complete details.

DENISON *Hydr*OILic

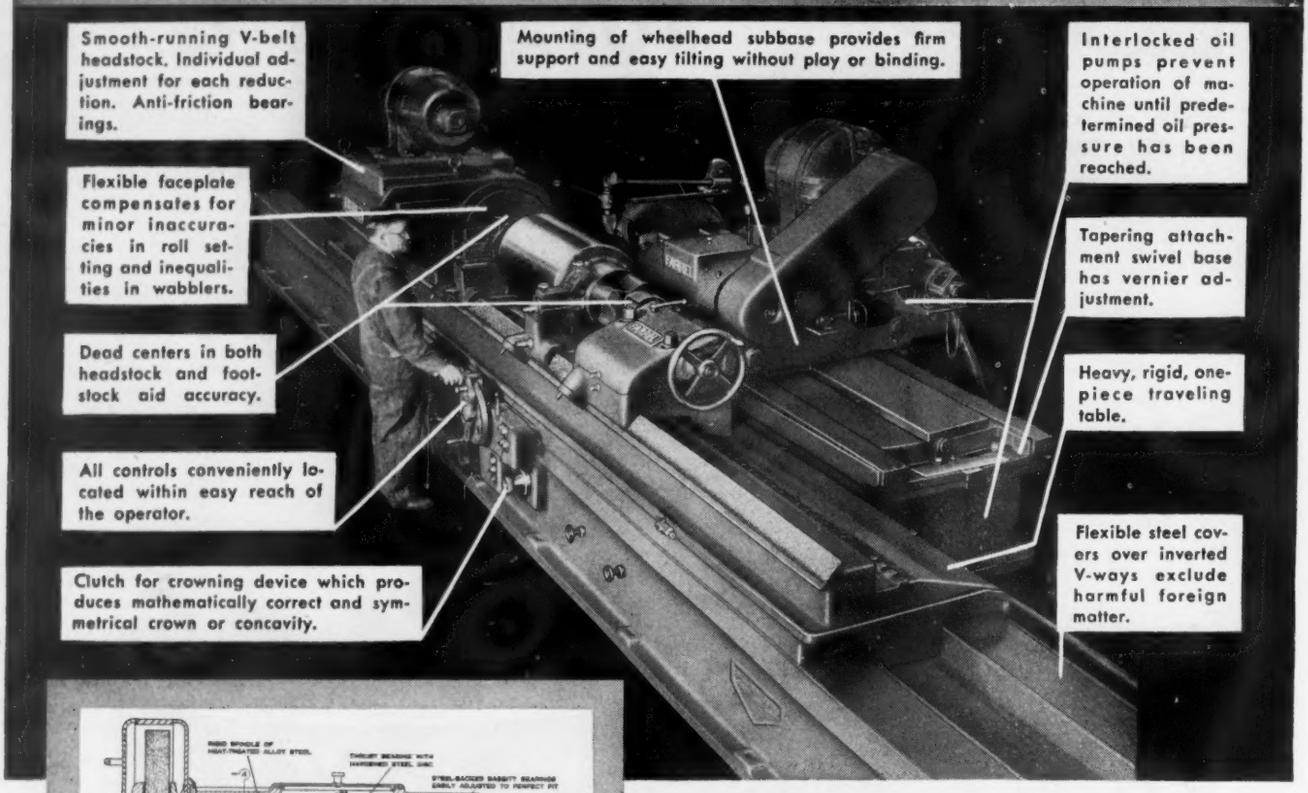
FLUID MOTORS

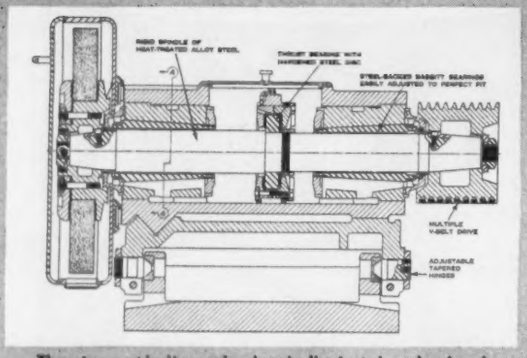


DENISON EQUIPMENT for APPLIED *Hydr*OILics

The DENISON Engineering Co., 1163 Dublin Rd., Columbus 16, Ohio

SOME REASONS FOR THIS ROLL GRINDER'S PRECISION PRODUCTION ABILITY


Smooth-running V-belt headstock. Individual adjustment for each reduction. Anti-friction bearings.
Flexible faceplate compensates for minor inaccuracies in roll setting and inequalities in wabblers.
Dead centers in both headstock and footstock aid accuracy.
All controls conveniently located within easy reach of the operator.
Clutch for crowning device which produces mathematically correct and symmetrical crown or concavity.
Mounting of wheelhead subbase provides firm support and easy tilting without play or binding.
Interlocked oil pumps prevent operation of machine until predetermined oil pressure has been reached.
Tapering attachment swivel base has vernier adjustment.
Heavy, rigid, one-piece traveling table.
Flexible steel covers over inverted V-ways exclude harmful foreign matter.



Thrust on grinding wheel spindle is taken by hardened steel disc and two babbitted rings at the center, which permit free expansion of spindle bearings.

. . . and what they give you

The performance-improving features that Farrel has engineered into this precision roll grinder give you four-way reduction in roll maintenance costs:

1. HIGH OUTPUT—The type TT roll grinder can be used for either heavy roughing or producing a high mirror finish. It is extremely fast on both types of work.

2. EASE OF SET-UP AND OPERATION — Many features contribute to ease of set-up and simplicity of operation.

3. HIGH ACCURACY—Design and construction promote and maintain precision in grinding straight, convex or concave rolls.

4. SIMPLIFIED TAPERING—When equipped with a tapering attachment, the machine will grind both roll necks and finish grind the body with the same setting of the roll.

The complete story, including sizes and capacities, of the type TT roll grinder is given in Bulletin No. 113. Send in the coupon for your copy. FB-355

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FARREL-BIRMINGHAM COMPANY, INC. (4.)
ANSONIA, CONN.

Please send me a copy of 32-page bulletin No. 113 describing Farrel Type TT Roll Grinders.

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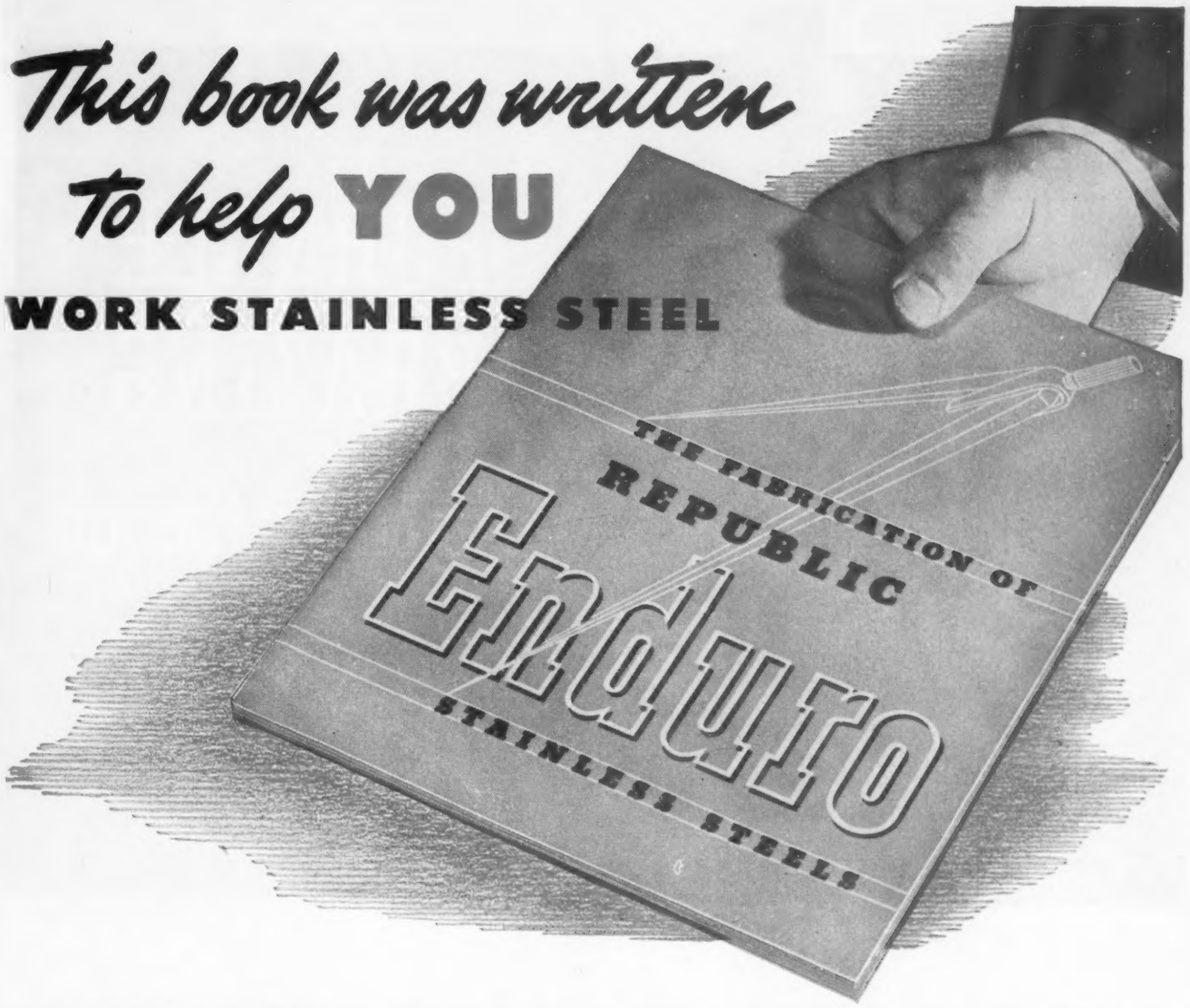
Farrel-Birmingham

This book was written to help YOU

WORK STAINLESS STEEL



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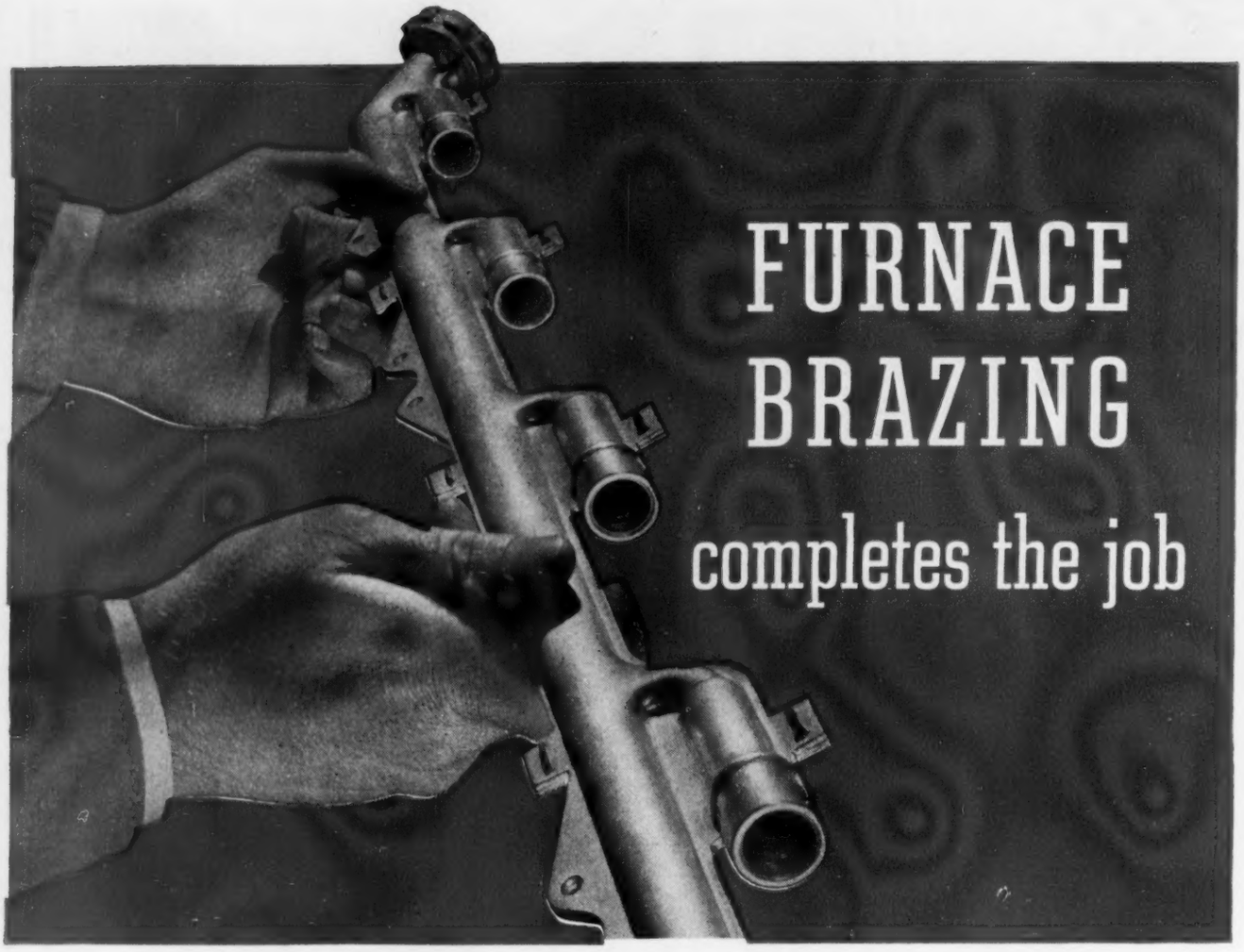

The two halves of this cable conduit are stamped out of Alcoa Aluminum Brazing Sheet. Placed face to face, the pipe couplings are added, and the assembly is held tightly together. Then into the furnace it goes, to be brazed into a solid unit . . . a quick, simple operation.

This part is made of a heat-treatable Alcoa Aluminum Alloy. It is quenched right from the brazing furnace, giving the necessary stiffness and strength. Thus, they avoid a reheating operation, further cutting the cost of production.

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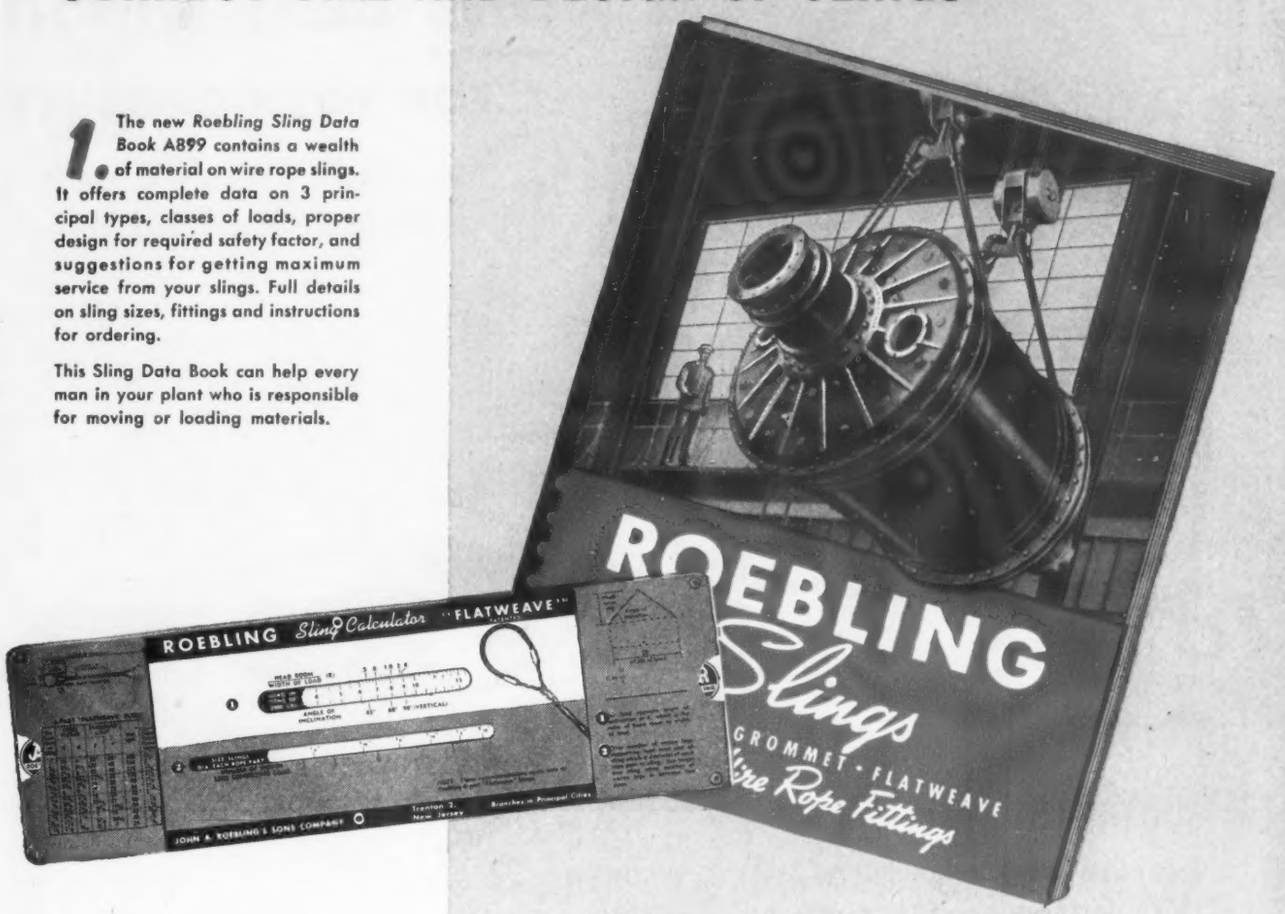
This Sling Data Book can help every man in your plant who is responsible for moving or loading materials.



2. A handy *Sling Calculator* is yours for the asking. It enables you to determine quickly and surely the safe working load for your Roebling Slings on every class of lift. May be used for wire rope or "Flatweave" slings. The durable surface has full printed instructions for use as well as handy tables and diagrams which will help you get the most from your slings.

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WHAT'S THE ONE BEST FINISH FOR YOUR PRODUCT?

. . . This Check Chart Helps You Find It!

WHEN A LACQUER'S properties match the service requirements—point for point—that's the right one to choose! With this handy Unichrome check chart, it's easy to make a quick comparison and a reliable choice—in a lacquer you *know* will be right because it checks (very good) and double-checks (excellent) with the requirements.

And you can be sure of getting top quality in *any* Unichrome lacquer you choose. For each one is made from the finest materials obtainable. Laboratory-controlled manufacture and severe tests are your assurance that every coating will live up to its charted performance. Let us send you additional, full size copies of the chart, with recommended uses and methods of applying the lacquers. Write your nearest Unichrome office.

CONSIDER THIS STEEL ASH TRAY, for example. It calls for a pigmented lacquer of exceptional hardness, gloss and adherence – which must resist burning, abrasion, perspiration and washing. The check chart reveals that the best finish for this job is B-124, because it checks (very good) and double checks (excellent) with the requirements. Thus, the manufacturer was able to select a standard lacquer to meet his special requirements for this product—with the help of the Unichrome check chart.

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Think of the power required to remove metal by grinding—often as much as 20 h. p. to drive a 3" wheel! When this power is dissipated over a line contact only 3" long, it produces momentary temperatures in excess of 2,000°. That's enough to cause metallurgical changes and destroy heat treatment on the surface. We refer to this defective layer as "smear metal" because it quickly wears on contact with a mating surface, giving off minute particles of metal which mix with the lubricant and start abrasive wear.

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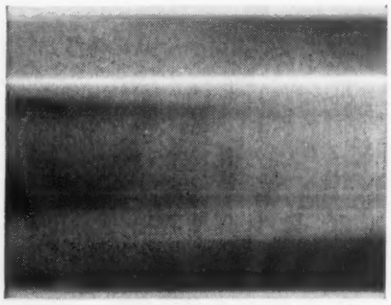
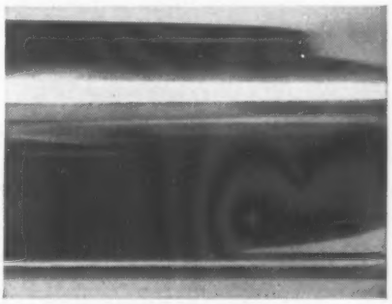
Superfinishing removes this defective layer of soft metal by the mild scrubbing action of a bonded abrasive as the part is rotated. The surface thus Superfinished cleans off "smear metal" down to metal of the desired hardness, free of all grinding defects. No appreciable heat is generated. There are no ridges or loose metal particles to rupture the oil film and abrade the surfaces. The life of such a bearing is unlimited.

If you have thought of Superfinishing as an expensive luxury, change your ideas. It is one of the quickest and most inexpensive processes in the field of metalworking. And it pays big dividends. Ask for complete information.



◄ An average ground surface like this of 28 to 30 micro inches appears very smooth. But the minute ridges and scratches in its softened surface will cause rapid wear and increase clearance dimensions.

This completely Superfinished surface (2 to 3 micro inches) has no defects to cause penetration of oil film or abrade mating surfaces. ►



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Gisholt Superfinishers are built in various styles including high production models, general purpose types, as well as attachments for use on lathes. Write for literature.

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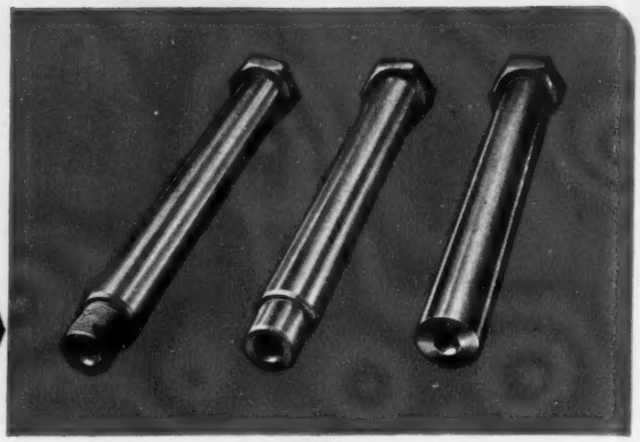

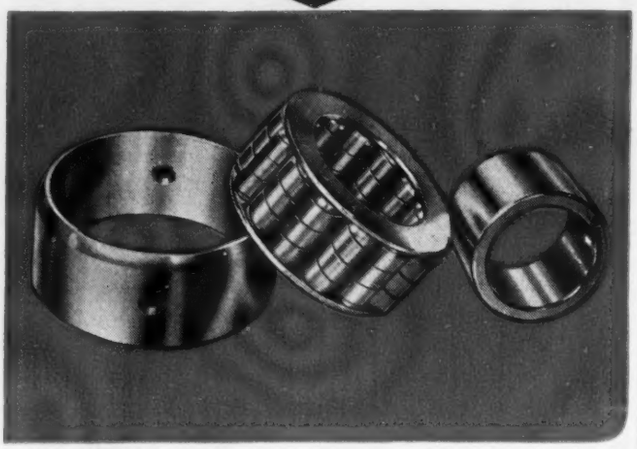

lighter,

stronger parts

at lower cost with B&W tubes

HOLLOW structural assemblies or precision working parts made from B&W Mechanical Tubing give *lightweight* construction with *heavy-weight* ruggedness and dependability. Warplane design demonstrated this fact and peacetime aircraft production will reap the benefit. In hundreds of other post war products, too, where lightweight ruggedness is important, B&W seamless and welded mechanical tubing offers practical design and production short-cuts that are worth looking into.

Take a moment to study the few parts shown here. All were made of easily-worked, dimensionally-accurate B&W Mechanical Tubing. Most of them were formerly made from costly-to-handle bar stock or forgings. Check into the possibilities of B&W tubing for speeding production on *your* products—and making important savings in time, costs and materials.

From its modern specialty tube mills, B&W can supply mechanical tubing—either seamless or welded—of the proper analysis, size, gauge, temper and finish for making practically any hollow machined or fabricated part. Let us know what you plan to make and we will gladly tell you how B&W Tubing can save you time and money.

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TA-1383

THE DOCTOR SAYS IT'S

"Industrial Arteriosclerosis"

What the Doctor means, of course, is "thickening of the walls of the arteries"—the rust-clogging of those all-important industrial pipelines that convey water, compressed air, gases, fuel oil, refrigerants, lubricants, and an almost endless variety of process materials in fluid form.

Symptoms may be evident in reduced volume of flow, inadequate pressure, increased pumping costs, or rust-stained solutions.

Surface coatings of any kind offer but temporary protection and, eventually, rust-roughened pipe interiors will accelerate "sliming-up," particularly in lines with threaded fittings. The result may be a product contaminated by flaked-off scale, non-seating valves, clogged indicating or recording instruments, untimely dismantling for cleaning, or premature pipe replacement.

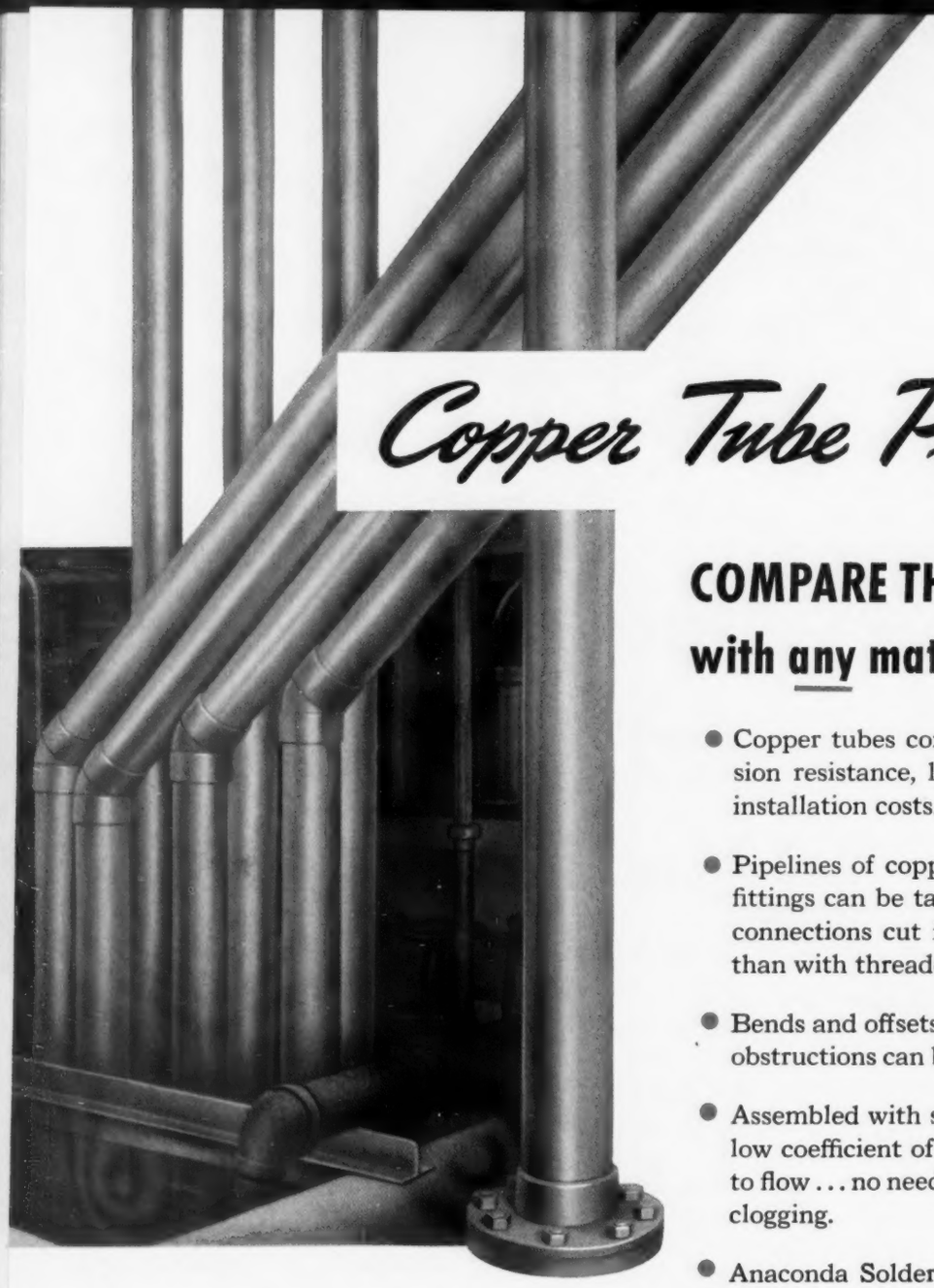
Copper tubes are not a panacea for all industrial piping ills—but they go a long, long way toward a permanent cure. Just how and why are explained on the following page.

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

ANACONDA

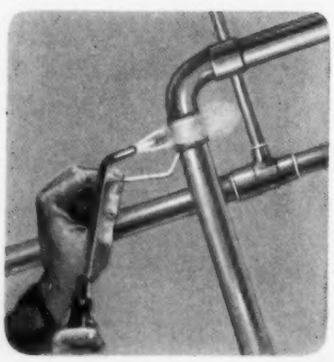
Anaconda COPPER TUBES AND FITTINGS



Copper Tube Pipelines?

COMPARE THEM—point for point with any material . . . at any price

- Copper tubes combine the advantages of corrosion resistance, light weight, flexibility and low installation costs.
- Pipelines of copper tubes connected with solder fittings can be taken down, moved, or have new connections cut in faster and with less expense than with threaded pipe.
- Bends and offsets to clear beams, girders or other obstructions can be made readily in copper tubes.
- Assembled with solder fittings, such lines have a low coefficient of friction and reduced resistance to flow . . . no need for oversize lines to provide for clogging.
- Anaconda Solder Type Fittings can be installed in restricted space where the use of a wrench would be impossible.
- Anaconda Copper Tubes in standard sizes are furnished to A.S.T.M. and Federal Specifications: Soft in 60-ft. coils; also hard and soft in 20-ft. straight lengths from $\frac{3}{8}$″ to 12″ in diameter. Larger sizes, up to 26″ I.D., can be made to order.



Publication C-24 tells a lot more about Anaconda Copper Tubes and Fittings. A copy will be mailed on request.

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

Subsidiary of Anaconda Copper Mining Company

In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

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ANACONDA

from mine to consumer

Anaconda COPPER TUBES and FITTINGS

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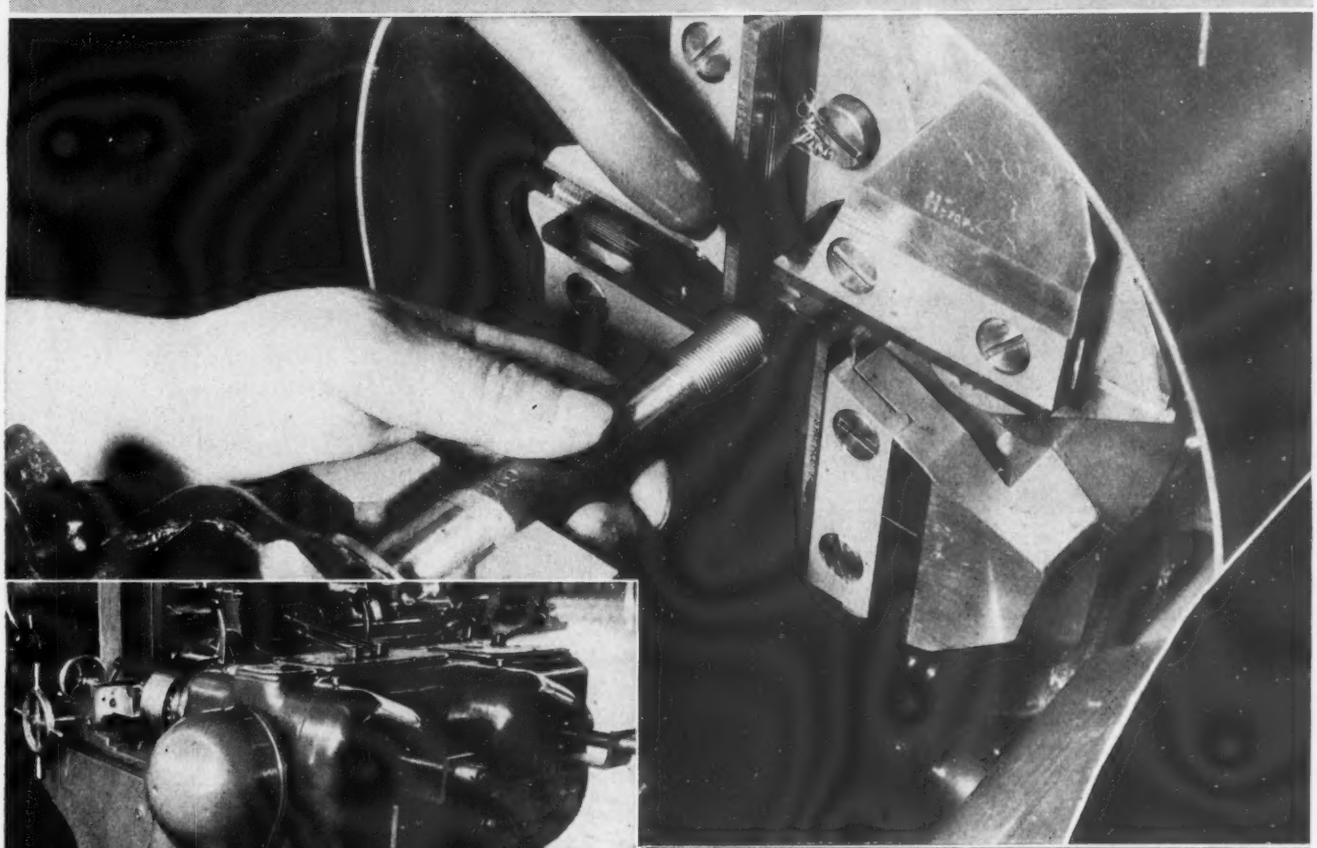
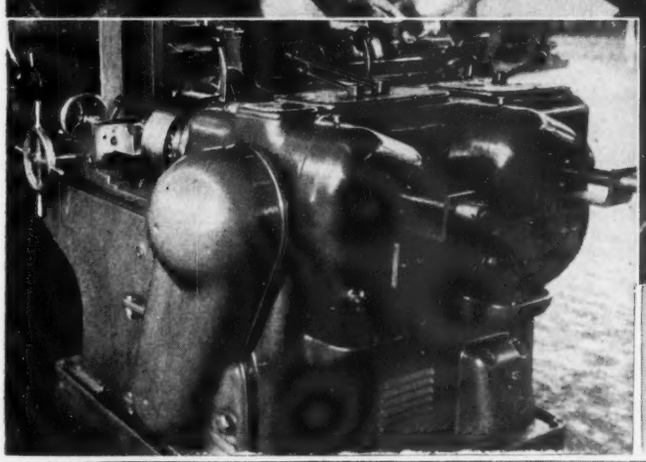
The widespread use of Landis Threading Equipment throughout the automotive industry—where threads must be held to closest tolerances—is just another proof that thread production throughout all metal industries can be safely and economically handled by Landis Threading Machines and Die Heads.





The Landmaco Threading Machine threading truck steering knuckles. Threads must be exactly right to assure the permanent holding of a vital part in a truck steering mechanism.

Write for Bulletin H-75

LANDIS MACHINE COMPANY

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OVENS • MELTING FURNACES

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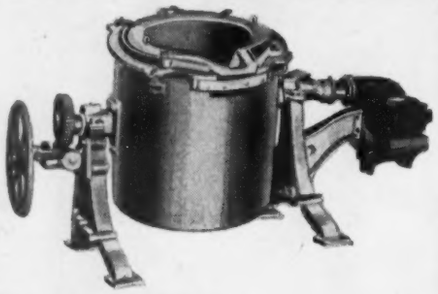

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Designs by Campbell-Hausfeld, Fisher, Stroman and others.

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All furnaces are sold under existing priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the War Assets Administration Certifying Office serving their area, and then to purchase the materials offered herein.

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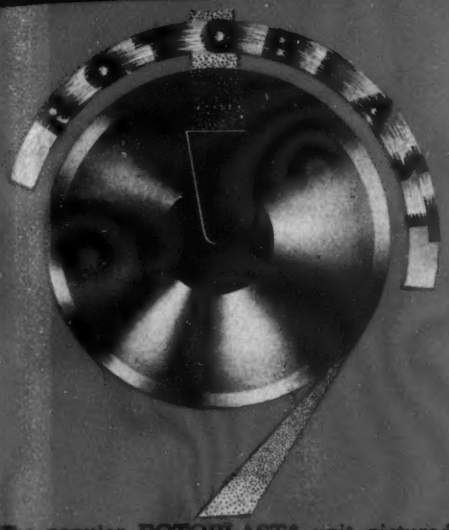
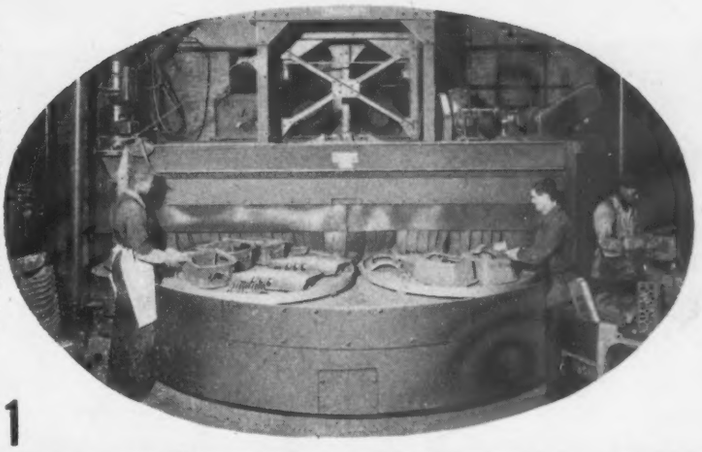
UNITED STATES STEEL



The popular ROTOBLAST* unit pictured above is standard Pangborn equipment on all Rocker BARRELS, Rotary TABLES and Special CABINET Machines.

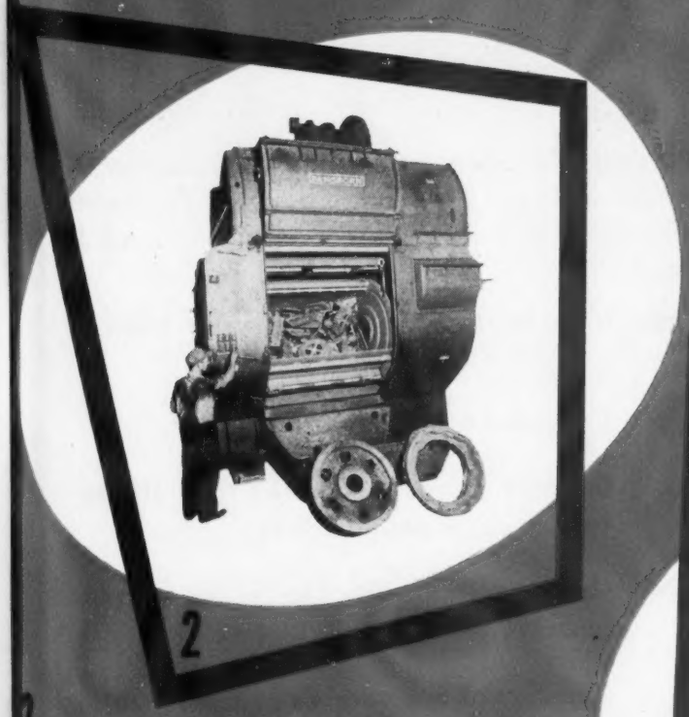
*Trademark of the Pangborn Corporation



1

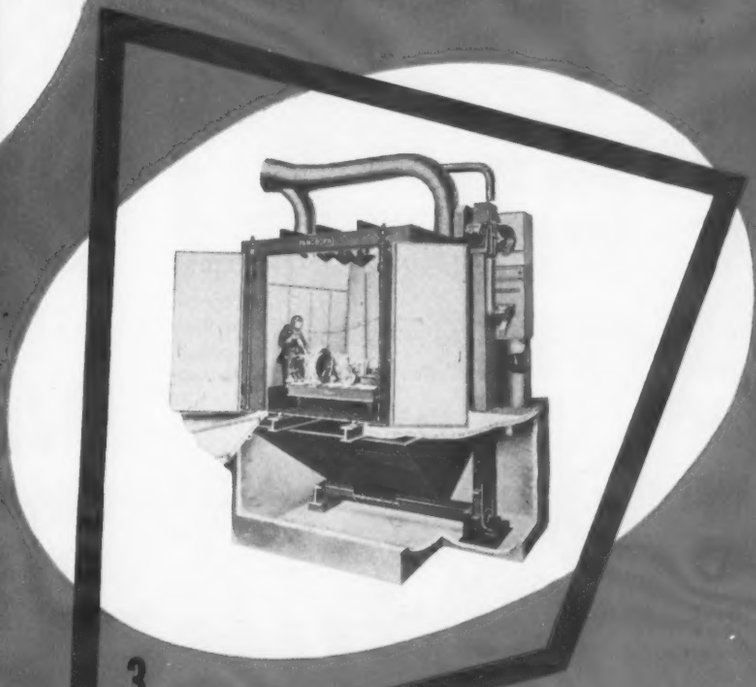
Pangborn

Blast Cleans Cheaper with the right equipment for every job



2

1. . . . ROTOBLAST CLEANING TABLE for Airless Blast Cleaning of Flat and Fragile Work or Unusual Shapes. Pangborn ROTOBLAST Table directs the blast stream onto the work, cleaning vertical and horizontal surfaces at the same time, giving all planes equal cleaning. Single-spindle tables: 6, 8, 12 and 14 ft. diam. Multiple-spindle tables: seven standard sizes from 4 ft. to 14 ft. diam., with auxiliary tables from 14 in. to 5 ft.



3

2. . . . ROTOBLAST ROCKER TYPE BARREL for Airless Blast Cleaning of Work Handled in Batches. Pangborn ROTOBLAST Rocker Barrel has exclusive Abrasive Separator and Cleaning System which restores usable abrasive to original cleanliness and efficiency by stratification and pneumatic handling. Six standard sizes.

Also: Special ROTOBLAST Machines individually designed for automatic cleaning of work which cannot be handled by tables or barrels.

3. . . . Air Blast Cleaning. Pangborn also makes a complete line of air blast equipment, including blast tanks, cabinets, rooms and special machines.

To *blast clean cheaper*, Pangborn supplies the right type of air or airless equipment for every job. For complete information on how Pangborn equipment can increase your profits — by cutting blast cleaning costs, reducing machining time, facilitating inspection, improving quality, etc., write to Pangborn, *world's largest manufacturer of blast cleaning and dust control equipment*. Pangborn Corporation, 1298 Pangborn Boulevard, Hagerstown, Maryland.

Pangborn

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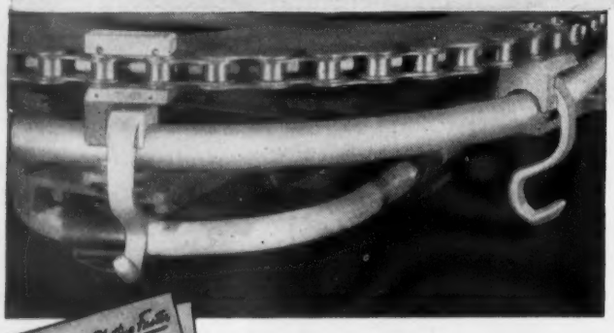

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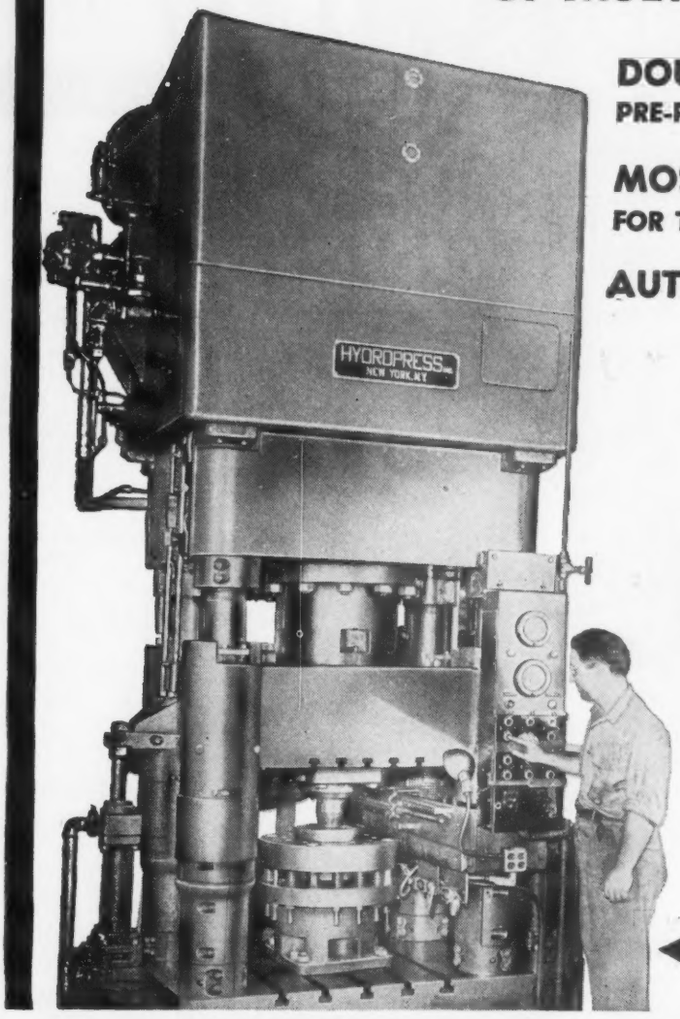

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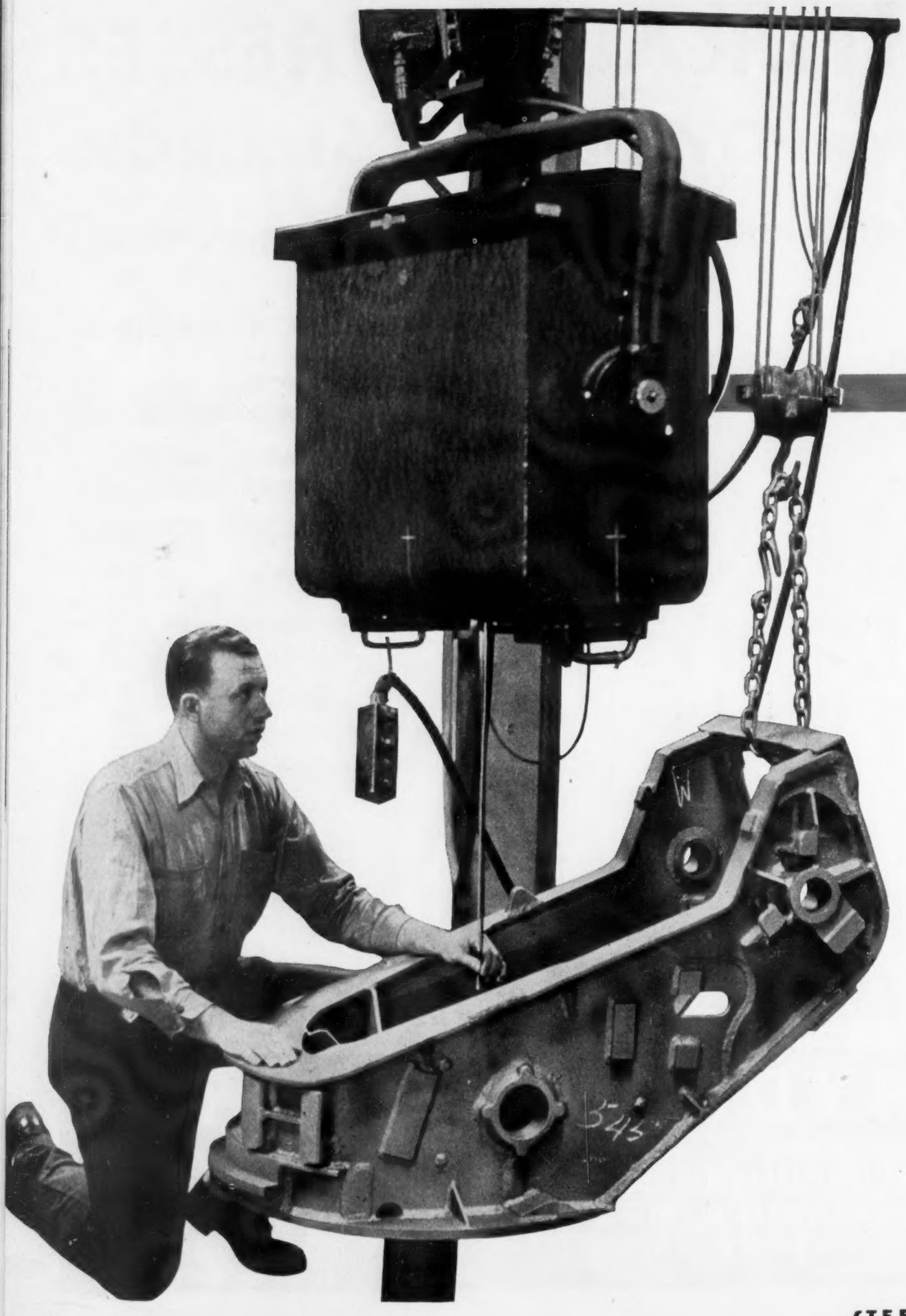

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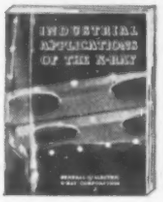

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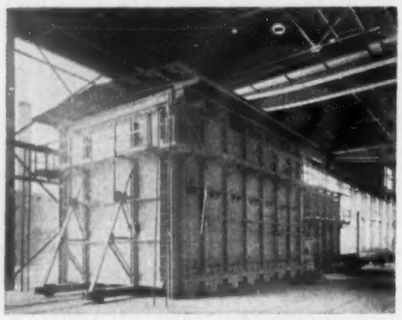
R-S FURNACE FACTS

ISSUED MONTHLY BY R-S PRODUCTS CORPORATION, PHILADELPHIA 44, PA., FOR THOSE CONCERNED WITH QUALITY HEATING OF METALS

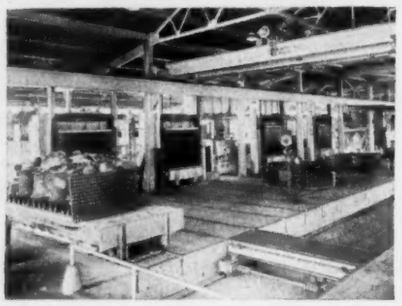
Blossoms from the R-S Car-Hearth Family Tree

The big brute with the gable roof is an R-S job for Westinghouse at Lester, Pennsylvania. They use it for stress-relieving and annealing of large weldments. It is direct fired with high pressure gasburners at both sides, top, and bottom. The 18′ wide and 16′ high door gives access to a heating chamber 32′



long. Because of low clearance under an overhead crane we put the door on the car so it moves away from the furnace instead of sliding up and down. Finished off with a sheet metal roof because the furnace was originally under an uncovered runway.

The battery of four R-S car-hearth



furnaces shown is at the Lebanon Steel Foundry, Lebanon, Pennsylvania. Actually, it's six, as there are two more on this side of the transfer pit. The two at left are direct fired for a temperature of 1600° to 2000°F; and two at right convection heated for 1000° to 1250°. Doors, cars, and transfer car are centrally operated from any of four control stations.

Paste it in your hat: if it's an old problem in heating, R-S has seen it and licked it. If it's a new problem, count on R-S engineers to come up with a treatment that will do the job, maintain high production, eliminate waste of human energy, and keep maintenance costs down.

R-S Furnaces Supply World's largest Hydraulic Die Forging Press

We have a few copies left of an illustrated report on the three R-S apron-conveyor furnaces which supply 6½ tons of magnesium and aluminum billets per hour to Wyman-Gordon's huge die forging press, and one R-S roller-rail furnace for heat treatment of final forgings. If you yearn for a copy, walk please, don't run, to the nearest pencil and jot your name and address on this page. Mail to S. M. Stoler, Sales Manager, R-S Products Corporation, Philadelphia, Pennsylvania, for your free copy.

A myopic heat-treater in Flint
Said, "I see it says here in fine print,
R-S Furnaces use
Any fuel I choose.
I'd call that a valuable hint."

R-S specializes, to be sure, but what we specialize in is Industrial Furnaces, Industrial Heating. We do not specialize in gas, oil, or electricity. We build your furnace to use the practical fuel.

P-A3

Carefree and Cost-free

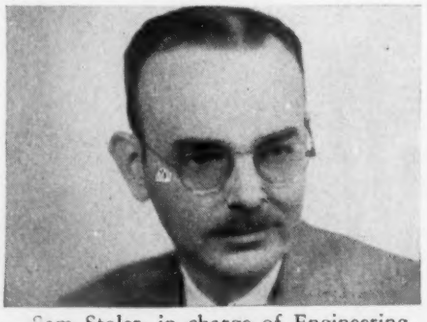
They used to say about automobiles, "It isn't the first cost; it's the upkeep that counts." In the steel business *maintenance* runs 8.2¢ per revenue dollar, so it's worth watching. Better yet, watch the furnace design and construction.

Sometimes you see a car-hearth furnace in which the rear wall is inadequately protected against entry of the car. If the operator judges his stop perfectly, all is well. If he doesn't the car coasts too far and stops with a bump . . . right up against an expensive brick wall. It seldom knocks the wall down the first time, but the day comes when you need a new wall. This is a waste of time, money, and refractory. It's one of the things you are protected against by R-S design and construction.

First, we build a car-stop on the rail to guarantee clearance between car-end and wall. Then, too, we install a disc-brake on the electric car-drive. The R-S car simply does not coast! When the operator turns off the current the car comes smartly to attention without bumping into the wall or tossing its load around. It's one of many little things which make maintenance cost extremely low on R-S Furnaces.

Samuel M. Stoler

The most valuable salesman, from the customer's standpoint, is one who is thoroughly informed on the technical aspects of what he has to sell.



Sam Stoler, in charge of Engineering Sales at R-S Products fills the specification. Ever since graduation from Baltimore Polytechnic Institute he has followed engineering as a profession.

As Chief Engineer of the Porcelain Enamel & Manufacturing Company, he built and installed complete porcelain enamelling plants for Norge, Kelvinator, and others. He designed the first continuous enamel smelting furnaces in the industry and the first continuous porcelain enamelling plant for washing-machines.

From 1935 to 1938, Sam was Chief Engineer of the Electric Heating Equipment Company, specializing in controlled atmospheres for non-ferrous processing; later Vice-President of Tate-Jones, and commencing in 1944 Manager of Engineering Sales at R-S Products.

Sam is a registered Professional Engineer of the State of Pennsylvania, a member of the A.S.M., the A.I. & S.E., the National Society of Professional Engineers, and the Engineering Society of Western Pennsylvania.

The plain truth is that when you discuss your furnace problem with Sam Stoler, you are talking with a qualified engineer who is competent to know that the installation is precisely tailored to the customer's needs.

In buying your R-S Furnace, you can be sure that sales zeal will never outrun Sam's professional pride in the product.

UNDERWATER TROWEL

Another problem solved by BWH

When a great river tunnel was under construction, water seeped through the seams of the excavated rock before the concrete lining could be applied. To plug these rivulets, a cement and sand mixture called Grout had to be pumped into the rock seams with rubber hose. The hose had to withstand pressures up to 1500 lbs. per square inch . . . and "take" the highly abrasive action of the Grout. For this difficult job, we recommended BWH Grout Hose.

This rugged hose is made with a high-grade, abrasive-resisting rubber inner tube. Plies of specially woven extra-heavy duck form the carcass. For flexibility, a spirally wound band of braided, high-tensile steel wire is imbedded beneath the two outer plies of duck along the entire length of the hose. Then tube and carcass are encased in a strong rubber cover, designed to withstand severe tunnel hazards. This tough BWH Grout Hose worked perfectly. Tunnel construction continued without costly delays. Grout Hose is just one of the many quality products manufactured by BWH. Whatever your need for industrial rubber goods, look to BWH for dependable ruggedness . . . BWH distributors for dependable service.

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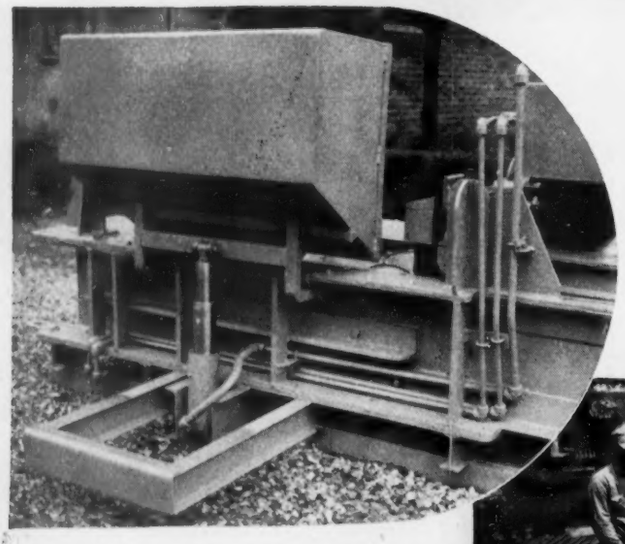

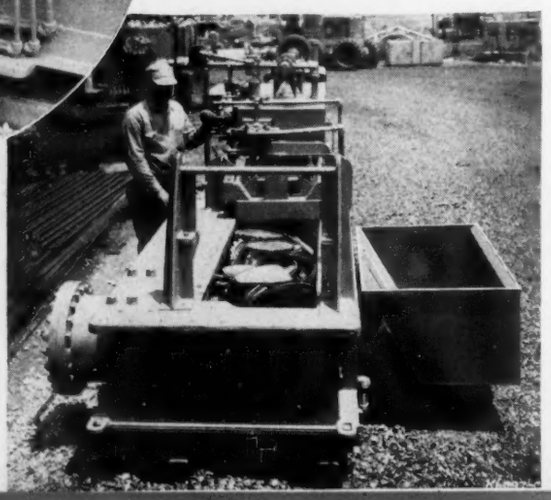

Shown above, top, the Dempster-Balester, Model 125, complete with Diesel Powered Motor. Above, the Skip Pan Loader fills the charging box, note the compact space saving construction of the loader, and the simplicity of the hydraulic dumping mechanism. Right, front view of the Balester with charging box full and loading pan ready for reloading.

This compact Dempster-Balester, Model 125 portable press, handles any type of scrap metal, no pits or foundations necessary—just place it where needed and it's ready to deliver dependable service for you. Designed for rugged every day service, with all points of strain built oversize to withstand internal stresses beyond the normal need of baling. Charging box is squared and completely lined with abrasion plates with all high spots and toughness machined off. Powered by Electric Diesel or Gas Motors, the Dempster-Balester, equipped with the efficient Skip Pan Loader, is setting increased production records everywhere. Delivers a high density, 125 pound bale that is easily handled from baler to furnaces.

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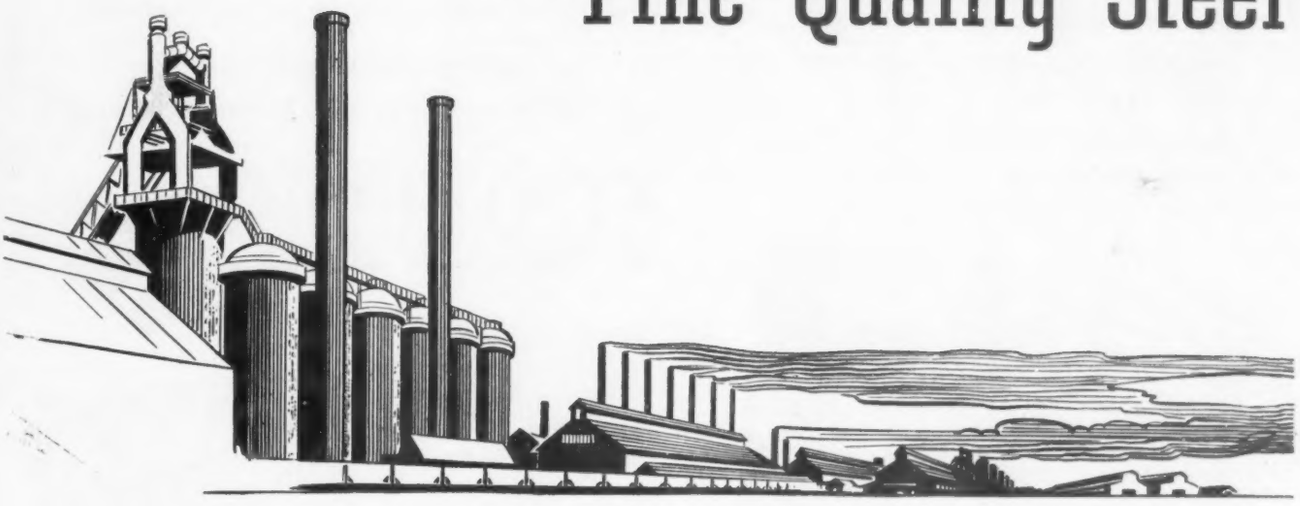

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And, since 1878, the manufacturers of the Nation and the Middle West have specified "Steel from Granite City" when they need fine quality steel tailor-made to their own particular specifications. They know that steel from Granite City is finer quality steel.

Granite City Steel Company

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Specify Kropp flat die, drop and upset forgings. Call the nearest Kropp engineering representative, or send your inquiries direct for immediate quotation.

KROPP FORGE COMPANY

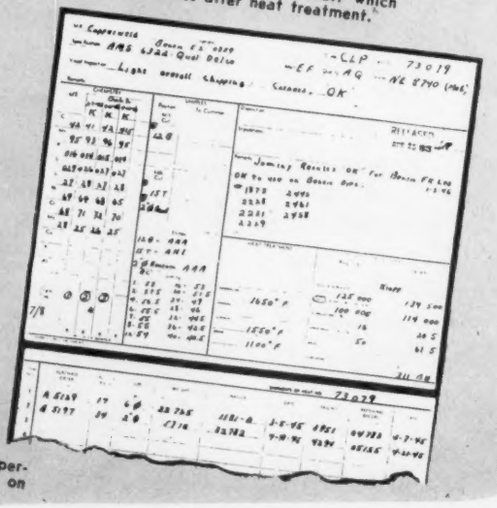
5301 West Roosevelt Road, Chicago 50, Illinois

KROPP K

Specimen of forging stock, sliced and deep etched to bring out the pattern of the metal.

Showing a prolongation of a forged spindle shaft which will be removed for test purposes after heat treatment.

A tensile testing machine at Kropp Forge.



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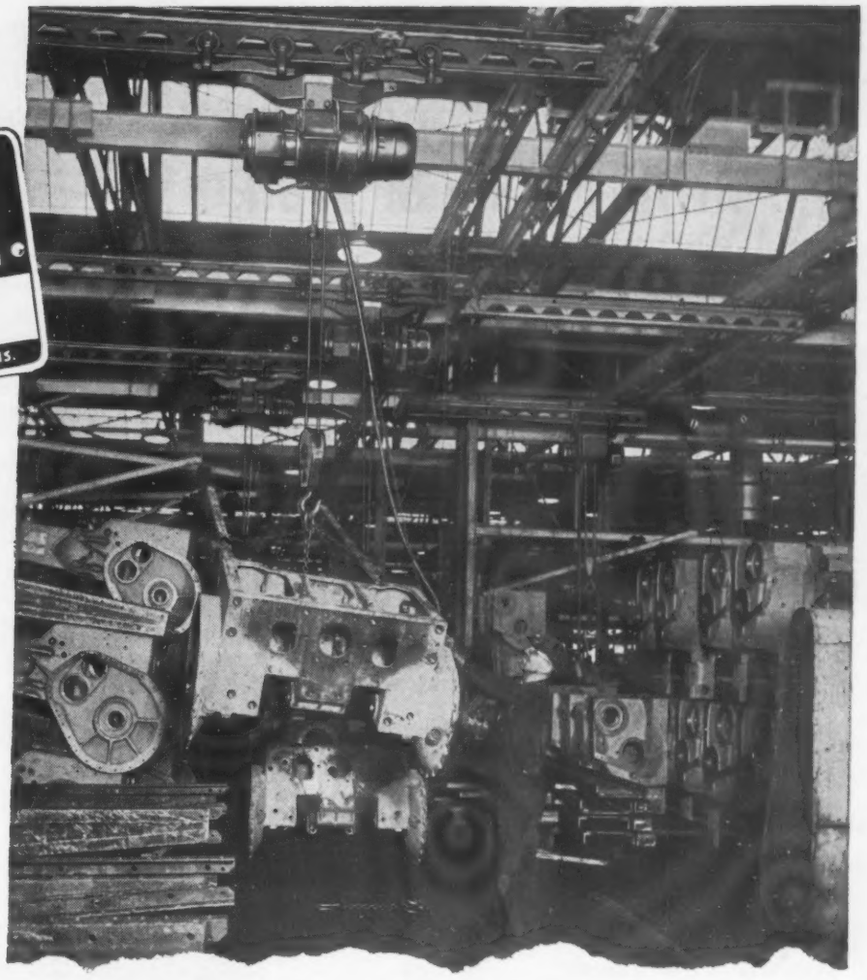

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—when you move them "THRU-THE-AIR!"

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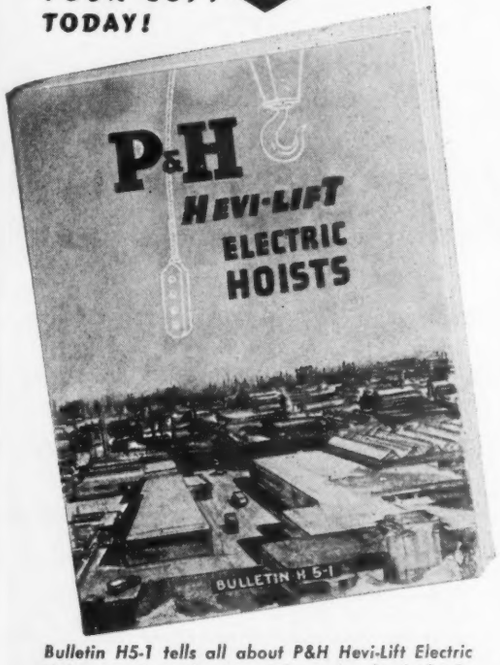

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Yes, one *man* does it all! Lifting . . . moving . . . "spotting" heavy loads exactly where they're wanted. And he does it all by pushing buttons!

Simple? Sure! So simple that more and more plants are finding "Thru-the-Air" handling the easiest way to cut costs — starting right NOW!

There's no waiting for results. Install a P&H Hevi-Lift Electric Hoist, and savings begin with the very first load!

Save these three ways:

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Yes, all these savings apply to your plant. For details on capacities and installations, call in a P&H Hoist Engineer — no cost or obligation.

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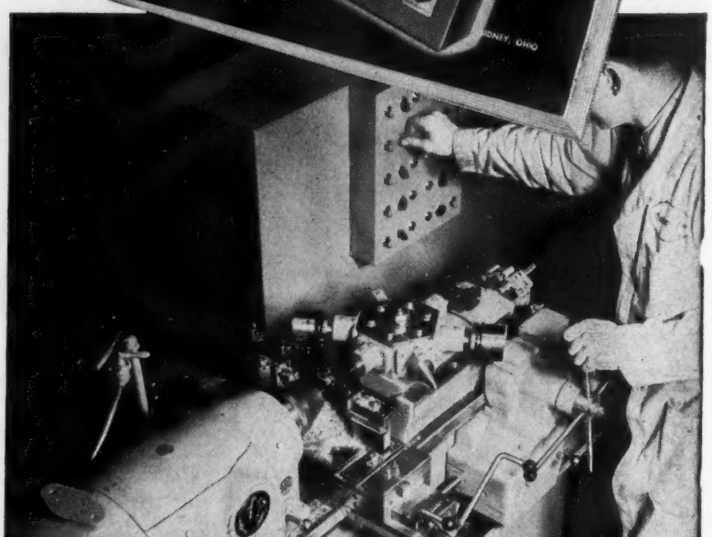

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Stamping, Plating Auto Parts
Air Pressure Speed Welding
New High Temperature Furnace
New American Tool Life Standard
Induction Hardening Steel

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 120, NO. 4 JANUARY 27, 1947

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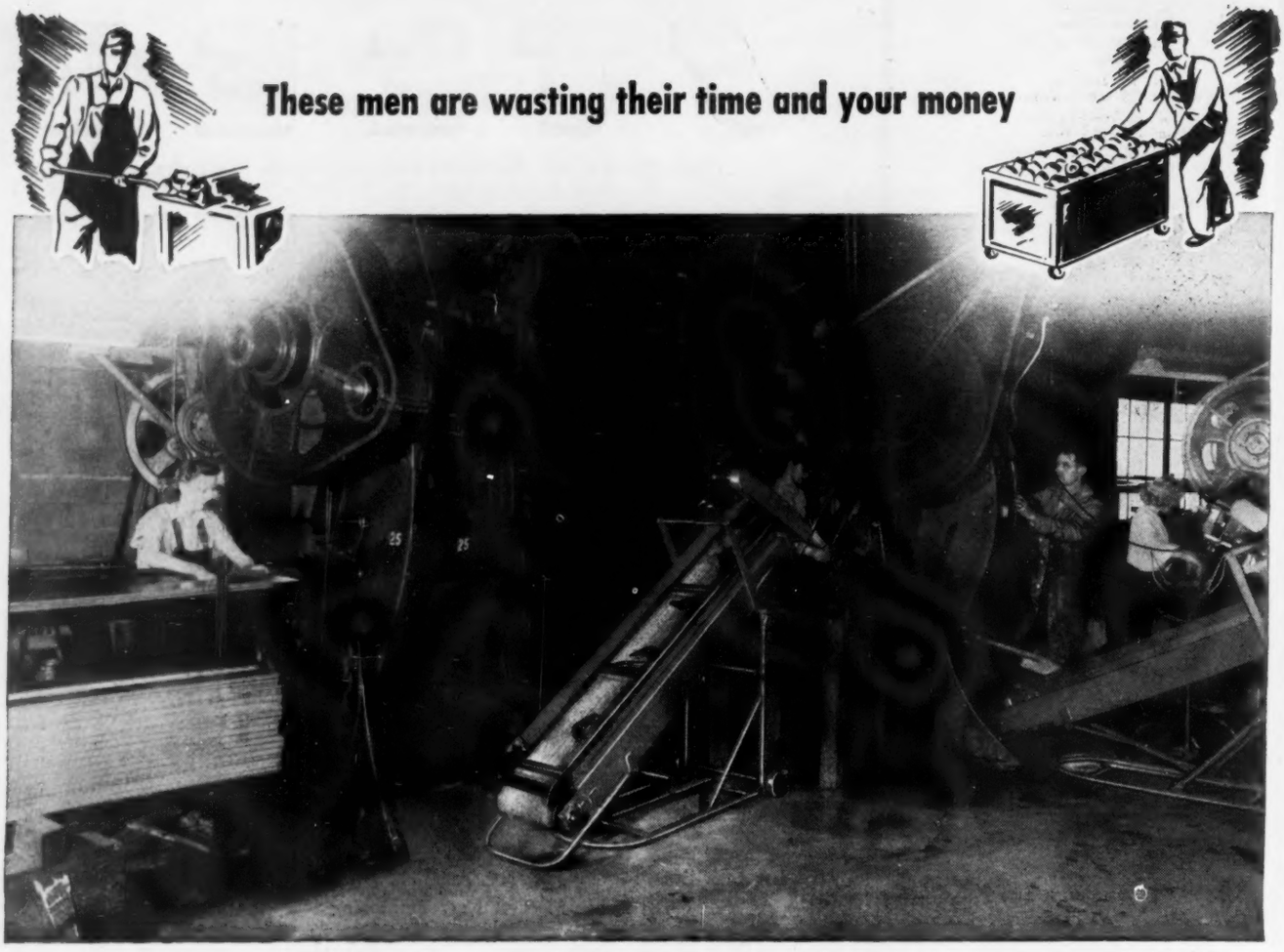

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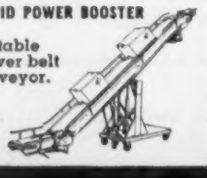

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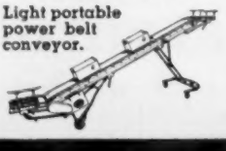

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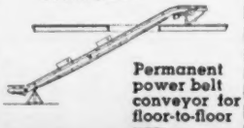

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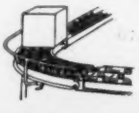

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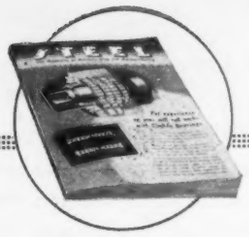

January 27, 1947

The "Ifs" Are Fading

A month ago when the experts were issuing their annual forecasts for the new year, most of them hedged their predictions with a formidable array of "ifs." Many of them said that 1947 would be a year of varying degrees of prosperity if too many strikes did not occur, if inflation could be controlled, if the President and Congress could work in harmony, if international relations did not grow worse or if something else did not occur.

Although the new year is not yet four weeks old, enough has happened to suggest that some of these "ifs" can be discounted.

For instance, prospects on the labor front are encouraging. Union leaders and representatives of management are sitting down to the conference tables in a spirit of give and take that is in sharp contrast to the bellicose attitudes displayed a year ago. Some prices are declining, Ford has reduced the price of cars and marginal trading has been resumed on a restricted basis—all straws in the wind to indicate that the inflationary trend is being checked. Washington is in a more co-operative mood than it was a year ago. International relations are no worse than they were—in fact, some competent observers believe there has been an improvement.

These faint signs do not mean that everything will be serene in 1947. Some strikes may occur, some prices will increase, the President and Congress will clash on some issues and there will be sporadic flare-ups in our dealings with other nations. However, the signs do point unmistakably to a trend toward sanity. It looks as if the hysteria which has prevailed since VJ-Day at last is giving way to reason.

Much depends upon how rapidly this transition from artificiality to reality in thinking proceeds in 1947. If we can ease ourselves off the plateau of make-believe and inflated values and down to the bedrock of sound economics fairly promptly, we may be able to avoid the necessity of going through a short term primary postwar depression as we did in 1921.

To avoid that ordeal is one of the challenges of the new year. It should be remembered that 1946 was a pretty good year for most people despite the fact that almost every national trend was running in the wrong direction. Now, with those trends in the process of being reversed, we have a fighting chance to get down to safe, solid ground without a serious smash-up.

• • •

10 GREAT INVENTIONS: If you know a school teacher, clergyman or other layman who is strongly convinced that machines destroy jobs, by all means have him read "Ten Great Inventions," a 32-page booklet published by the National Machine Tool Builders' Association.

The inventions discussed are Cartwright's power loom, Howe's sewing machine, Whitney's cotton gin and concept of interchangeable manufacture, Blanchard's self-acting lathe, Fulton's steamboat, Stephenson's locomotive, Lechner's mechanical coal cutter, Mergenthaler's linotype, Sholes' typewriter and Tytus' continuous sheet mill.

No claim is made that these are the 10 greatest inventions. However, all are important and all shared a common experience when they were first introduced to the public. In each instance, the new machine met with violent opposition. In some cases, hand workers rioted, protesting that the machines would deprive them of their means of livelihood.

Naturally the introduction of these inventions necessitated far-reaching social and economic adjust-

(OVER)

AS THE EDITOR VIEWS THE NEWS

ments, but the over-all result in every case was a reduction in costs, a great expansion in demand and the creation of many jobs that had not existed before.

Anybody who reads this booklet will understand why Henry Ward Beecher said that "a tool is but the extension of a man's hand, and a machine is but a complex tool. And he that invents a machine augments the power of a man and the well-being of mankind." —p. 95

• • •

LEAD-TIME IMPORTANT: Manufacture of truck-trailers has become a business of impressive size. At a meeting of the Truck-Trailer Manufacturers Association, it was estimated that production in 1947 will top 100,000 and may range as high as 150,000. At an average sale price of $2000 per trailer, the value of the industry's output would total from $200 to $300 million.

The industry's requirements for sheets and strip steel are about 200,000 tons annually. Production of 100,000 trailers would require about 114,000 tons of springs. Suppliers of steel, wheels, axles, brakes, springs, bolts and nuts and other materials, parts and components all were fairly optimistic regarding their ability to provide their products in sufficient volume for production of 100,000 trailer units this year. At the same time, they stressed the desirability of giving suppliers ample lead-time on orders.

Lead-time may become an important by-word in 1947. —p. 49

• • •

TEST FOR EFFICIENCY: An article in this issue on the subject of measuring idle time touches on a problem that calls for clarification and solution in 1947. It is the problem of unscrambling the factors responsible for inefficient production and prescribing the proper remedies.

Since V-J Day much of the decline in efficiency has been attributed to the poison of anti-employer propaganda spread by some reckless union leaders and to the tendency of many workers to relax after the ordeal of wartime pressures. These factors figure prominently in the picture, but there are others equally important.

Among them are losses involved in widely fluctuating operations caused by shortages of materials and labor and complications arising from the necessity of using substitutes.

Industry needs a fair test of its postwar efficiency. Given three months of uninterrupted operations with adequate materials, supplies and manpower, management soon could spot the real causes of inefficiency. —p. 77

SIGNS OF THE TIMES: Two contracts awarded by the War Department's Manhattan Project—one to Monsanto Chemical Co. and one to General Electric Co.—may lead to a clearer understanding of the problems involved in putting atomic energy to useful, peacetime work. As a result of experiments to be conducted under these contracts (p. 90) it is possible that a pilot plant in which the energy released from nuclear fission will be utilized in a steam-electric plant of conventional design may be in operation by 1948. . . . While industrialists have been reticent in voicing their reactions to the modest cut in prices by Ford Motor Co. (p. 57), there is an undercurrent of unofficial opinion that this move was timely and that it will have favorable repercussions. . . . A study of employment conditions in the San Francisco Bay area (p. 62) indicates that workers are becoming less fussy in regard to wages, hours and working conditions in seeking jobs and that employers can be more selective in hiring employees. There is a good market for skilled workers, but the supply of unskilled men far exceeds the demand. . . . Electric furnace brazing, employing copper as the brazing metal without the use of flux (p. 71), is the key operation in the manufacture of the Aer-a-sol insecticide bomb, popular during the war and now in demand for domestic use. . . . Eightieth Congress is getting off to a good start but is handicapped (p. 50) by the necessity of having to recruit a new staff of competent skilled advisers. . . . British Iron & Steel Federation estimates that production of steel ingots in 1947 will be between 13 and 13½ million gross tons. This would represent a moderate increase over the output of 12,693,000 tons (p. 54) recorded in 1946. . . . Machine Tool Editor Guy Hubbard, reflecting upon highlights of the recent annual meeting of the Society of Automotive Engineers and pondering over the marked degree in which the scope of its activities has broadened in recent years (p. 95), suggests that the well-known initials SAE may well stand for "Sea-Air-Earth". . . . In earmarking $34 million for a six-year program of research, construction and expansion in iron ore beneficiation and $6 million for developing underground mining operations in the Minnesota ranges (p. 43), Oliver Iron Mining Co. recognizes in a practical way the need of greater conservation in the extraction of ores from this great storehouse of mineral resources.

E. L. Shaner

EDITOR-IN-CHIEF

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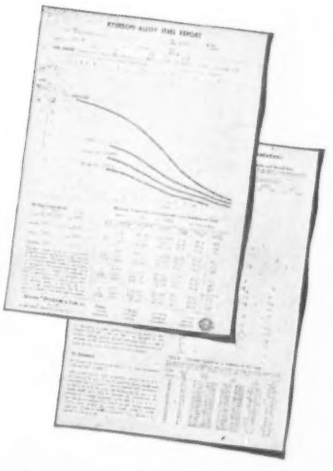

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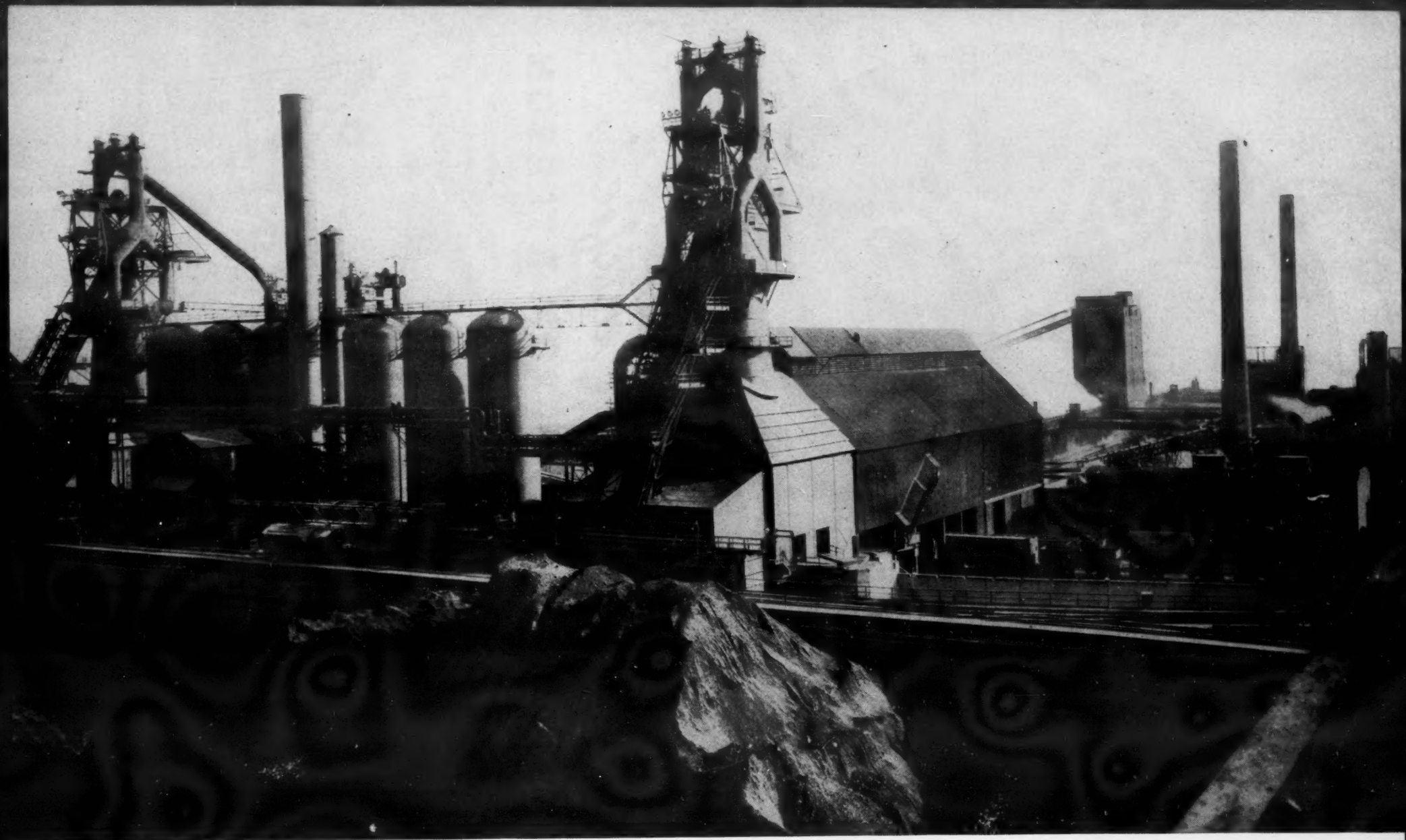


VIEW OF FORMER GOVERNMENT OWNED BLAST FURNACE PLANT BOUGHT BY INLAND

This plant was originally built and operated by Inland for the government to produce additional iron for war purposes. It covers 50 acres adjoining Inland's Indiana Harbor Works, and includes two 1,000 ton blast furnaces, two batteries of coke ovens, and a by-product plant.

The purchasing agreement provides that Inland shall produce merchant pig iron for the veterans' housing program for a period of time. Later on, however, it will form the basis for an increase in Inland's overall steel capacity.

INLAND STEEL COMPANY, CHICAGO, ILLINOIS

INLAND STEEL COMPANY, CHICAGO, ILLINOIS
includes two 1,000 ton blast furnaces, two batteries of coke ovens, and a by-product plant.

STEEL
January
27
1947

Steel Warehouse Order Load Still Rising

Veteran steelmaker William Babcock inspects a corrugated steel sheet being rolled into a culvert at Carnegie-Illinois Steel Corp.'s Gary works

Distributors entertaining largest peacetime demand in history. Seek to build stocks which are inadequate and unbalanced despite substantial receipts from mills over recent months. Pricing problems complicate situation

By WILLIAM M. ROONEY
News and Market Editor

WITH demand for steel unabated, and supply shortages hampering metalworking operations in many directions, iron and steel warehouse operators are grappling with the greatest peacetime order load in history. Not only is normal warehouse consuming trade larger, but mill buyers are flooding distributors with requests for tonnage as they seek to fill holes in their supply bins.

Much of this business, of course, is going begging since warehouse stocks are inadequate to accommodate it despite substantial tonnage receipts from producing mills over recent months. The drain on warehouse stocks has been constant so that operators have been unable to build or balance inventories to any appreciable extent.

This dearth of mill and warehouse steel has opened the door to opportunist speculators and brokers to play the market for all it is worth. Premium prices are being asked on substantial offerings from these latter sources, on flat-rolled products up to 14 cents per lb being quoted. While relatively few manufacturers have been taken for suckers by the speculators, the flood of offerings at inflated prices has given rise to concern among the mills and warehouses who fear they will be charged with "kiting" the market. Indicative of this concern is the fact that the matter was the subject for extended discussion at the recent CPA Steel Industry Advisory Committee meeting in Washington.

Just where this premium-priced steel is coming from is something of a mystery. The producers deny any of it is being shipped direct from their mills into the bootlegger market, though it is conceded some tonnage may be diverted into speculative channels after receipt by a legitimate mill purchaser. Some of the tonnage is believed to come from government surplus stocks. Most of it, however, is thought to originate in distress export stocks, and from surplus inventory held by manufacturers who have future commitments on steel mill order books and are not in immediate need of tonnage on hand because of inability to carry through manufacturing programs due to components shortages, or because of changes in specifications.

Correction of the situation depends almost entirely upon improvement in overall steel supply. Neither the mills nor the warehouses can keep sufficiently close track of shipments from their plants to prevent some tonnage seeping into "bootleg" channels. However, since offerings of this premium tonnage largely are made to small manufacturers whose steel needs ordinarily are cared for by the warehouses, enlargement of distributors' stocks would help tremendously in discouraging undercover trading.

Warehouse receipts of steel from the mills continue substantial and are expected to increase as overall demand and production come closer in balance.

as is expected in most products by mid-year.

That the mills have been striving to care for the small consumers' requirements is reflected by the fact that the warehouse industry provided the largest tonnage outlet for the mills last year. Actually, in the first eight months of 1946 the distributors took 5,534,496 tons of the 29,621,645 tons produced. This was 18.7 per cent of the total, and was an increase of about 25 per cent over annual warehouse receipts averaging 14.9 per cent in the five-year period, 1936-1940. In 1936 the distributors received 4,108,000 tons or 14.3 per cent of total shipments; in 1937 they took 4,341,000 tons or 13.28 per cent; in 1938 something like 3,202,000 tons or 17.13 went into distributing channels; in 1939, about 5,179,000 tons or 15.64 per cent, and in 1940, about 6,886,000 tons or 14.6 per cent. In the peak war year, 1944, the warehouses received 6,823,780 tons or 13.2 per cent of total shipments.

From these data it can be seen that warehouse distributors' receipts over the recent past have bettered those prior to the war. Nevertheless, warehouse stocks have been inadequate and at no time since the end of the war have the distributors been able to build sufficiently balanced inventories to properly care for their market. This partly was due to government price control which discouraged production of certain products sizes and shapes by the mills.

Since removal of government control late last year some improvement has been noticed in production of scarce items, freedom in pricing encouraging the mills to resume or enlarge the output of previously unprofitable products. However, in recent weeks a new problem has arisen for the warehouses as a result of complications in ordering and pricing due to changes in mill extras.

Mill extra cards have undergone drastic revision on major production items. Many charges have been increased and in addition a number of new charges have been added on most products. Interpretation of these extra cards and translation of the net mill prices to the warehouse level are proving extremely difficult because of the varying demands of consumers. Further, because of these varying demands, the warehouses are in a quandary as to what sizes and qualities to order for stock in view of the mill extras applying per specific order.

For example, changes in hot-rolled carbon bar extra cards provide some provoking questions. Some extras, for instance, apply on rounds and not on flats, some on carbon steel and not on alloy. In ordering for stock what should the distributor specify for length: 1, standard cutting to specified lengths; 2, all random lengths; 3, in multiples of not over 5 ft; 4, in dead lengths of 10 ft or more.

With respect to machine straightening should he specify: Lighter than ¼ lb per ft; ¼ lb per ft or heavier to ½ lb inclusive; over ½ lb per ft or heavier to ¾ lb inclusive; over ¾ lb per ft or heavier to 2 lbs inclusive; over 2 lbs per ft.

As regards bundling, he is uncertain whether to order bundle weights under 2000 lbs to 500 lbs inclusive, or bundle weights under 500 lbs. He is puzzled with respect to ordering for lift weight, avoidance of extra charges here possibly involving installation of new equipment.

Wrapping, boxing, loading and handling also present questions involving extra charges, while ordering for quality and chemical requirement has him completely stumped since it is impossible for him to anticipate consumers' specifications which may be changed from past purchases to escape higher extra charges.

Until these questions arising from the revision in extras are disposed of, the warehouse steel market is likely to be unsettled.

SHIPMENTS OF STEEL TO WAREHOUSES AND TOTAL PRODUCTION

(Net Tons)

	FIRST EIGHT MONTHS, 1946		ENTIRE YEAR, 1945	
	Shipments to Warehouses	Total Mill Production	Shipments to Warehouses	Total Mill Production
Ingot, blooms, billets, slabs	10,427	1,242,661	31,884	4,996,934
Skelp	318	135,838		381,164
Wire Rods	6,535	414,375	11,812	862,521
Structurals & piling	480,962	2,078,400	917,142	3,763,952
Plates, U. M and sheared	412,628	2,509,584	745,663	6,841,304
Rails and accessories	21,339	1,611,705	35,501	3,292,244
Hot-rolled bars	626,360	3,861,278	1,210,024	7,494,994
Cold-finished bars	311,932	926,050	448,156	1,937,977
Reinforcing bars	220,599	722,420	155,205	837,577
Tool steel bars	9,788	63,839	16,586	121,391
Butt weld pipe	532,365	805,595		
Lap weld pipe	115,876	184,859		
Electric weld tubing	139,733	412,815		
Seamless tubing	555,266	1,115,851	2,243,123	5,752,752
Electrical conduit	27,435	55,634		
Mechanical and pressure tubing	87,087	274,257		
Wire, drawn	88,225	1,165,777		
Nails & staples	250,463	363,228		
Barbed and twisted wire	100,510	132,715	1,248,596	3,228,715
Woven wire fencing	183,553	243,062		
Bale ties	43,682	58,714		
Black plate	48,728	557,208	92,929	742,458
Tin and terne plate	33,844	1,824,896	50,220	2,922,374
Hot-rolled sheets and strip	574,059	4,142,665	1,096,744	7,753,550
Cold-rolled sheets and strip	328,336	3,576,625	594,035	4,133,779
Coated sheets	294,253	919,745	647,748	1,695,796
Wheels & Axles	186	229,921	363	440,538
All others	424	26,596	25,705	41,719
TOTAL	5,534,496	29,621,645	9,571,436	57,242,240
Alloy	132,094	2,000,847	.....	.....
Stainless	36,241	187,078	.....	.....
Warehouse % of total				
Mill production	18.7			
Alloy	6.6			
Stainless	19.4			

Exports of Leading Steel Products In 1946 Lag Behind 1945 and 1941

EXPORTS of principal steel products for the 12 months ended Oct. 31, 1946, lagged behind foreign shipments for 1945 and for 1941, according to statistics just released. Declines were particularly sharp in wire nails, welded steel pipe and welded galvanized pipe and galvanized sheets, which were in very short supply for the domestic market.

Exports for selected products last year, compared with 1945 and 1941, are shown in following table:

STEEL EXPORTS

(Net tons)

	1946*	1945	1941
Steel sheets, black	471,118	742,423	480,077
Steel sheets, galv.	87,625	174,746	118,987
Tin plate	358,361	470,638	387,847
Structural shapes	308,883	343,790	351,841
Welded steel pipe	46,372	64,326	86,246
Welded galv. pipe	53,800	57,292	80,505
Wire Nails	20,758	31,263	56,808
Reinforcing bars	213,094	267,080	170,368

* 12 months ended October, 1946.

U. S. Steel Corp. Launches Large Iron Ore Beneficiation Program

Ore mining subsidiary plans $34 million expenditures over next six years in research, construction and expansion on Mesabi Range. Extensive fundamental research on magnetic and non-magnetic taconites to begin this year

DULUTH

A LONG range program of research, construction and expansion in iron ore beneficiation entailing expenditure of over $34 million in the next six years is planned by the Oliver Iron Mining Co., U. S. Steel subsidiary. R. T. Elstad, president of the Oliver company, said the first step in the program will be inaugurated this year by an expenditure of over $2 million in construction of two beneficiating plants.

Included in the plans are construction of four additional beneficiation plants of varying size and capacity, to be located at various points on the Mesabi Range; also additional facilities at the company's research laboratory at Duluth.

The program covers not only use of marginal and high silica ores, requiring the mining of many more tons of material and the use of more labor and equipment than in the case of direct shipping ores, but also further reclamation of fine ores now being lost in tailings. Extensive fundamental research work on magnetic and non-magnetic taconites will begin this year, as an extension of the work done by Battelle Memorial Institute with which Oliver's research laboratory has been co-operating during the past three years.

Laboratory Established

Recently the Oliver company established a research laboratory at Duluth to continue and intensify its pioneering program of research in the general improvement of Lake Superior district iron ores used by the steelmaking facilities of the United States Steel Corp. While the laboratory is not yet in full operation, it already has an annual payroll of over $100,000.

The company has been carrying on for many years a program designed to study ways and means of improving iron ores currently being mined and to make experimental investigations of the concentration of lower grade iron ore formations for future use.

The plans disclosed last week contemplate further steps in this long range program conducted with a view toward increasing and conserving natural resources through intelligent use of marginal ores and taconite, thus assuring extension of the life of the mining industry in Minnesota for many years to come. In addition to the $34 million program, the company is planning to make investments of over $6 million in the development of underground mining properties.

Mines Bureau Establishes Several Mining Operations

Several successful peacetime mining operations were established by the Bureau of Mines last year for copper, lead and zinc, mercury, and feldspar and new reserves were marked out in iron ores, fluorspar, mica corundum, beryl, bauxite and ores of tungsten, nickel and manganese.

The largest potential reserve of magnetite was located in Iron county, Utah, where a deposit estimated at about 375 million tons is expected to be the principal raw material source for iron ore for the Pacific Coast steel industries.

This was disclosed in the bureau's annual report to the secretary of the interior. Outstanding in the bureau's metallurgical research last year was the production of the following four new highly pure metals: Electrolytic chromium, electrolytic cobalt, ductile titanium, and ductile zirconium. These four pure metals, added to the bureau's prewar development of electrolytic manganese and sponge iron, are expected to solve many problems in research requiring metals for high temperature service.

Present, Past and Pending

■ FERGUSON TO RELOCATE IN CLEVELAND

CLEVELAND—Harry Ferguson Inc., Detroit, which will end its tractor manufacturing agreement with Ford Motor Co. June 30, will relocate production of the Ferguson tractor in the Cleveland Pneumatic Aerol Co. plant, purchased from the WAA for a reported $1,900,000. Designs for the new tractor have been completed and releases made on initial production materials. Planned production capacity will be 1000 units a day.

■ FINLAND TO USE LOAN TO BUY U. S. MACHINERY

WASHINGTON—Export-Import Bank has granted a $32 million loan to Finland. Of the total, $20 million will be used to purchase United States machinery and equipment.

■ TRUCK PRODUCTION HITS PEAK IN 1946

WASHINGTON—Production of trucks reached a record high of 940,583 civilian type units in 1946, according to the Office of Temporary Controls. Passenger car output totaled only 2,155,924 units.

■ COLORADO FUEL & IRON EARNS $876,310

DENVER—Colorado Fuel & Iron Corp. had net profit of $876,310 in quarter ended Dec. 31, compared with $1,025,126 in the third quarter. In fourth quarter, 1945, company reported a net loss of $452,214.

■ APPRENTICE PROGRAMS REACH ALL-TIME PEAK

WASHINGTON—Apprenticeship programs in industry rose to an all-time high of 16,574 in 1946, representing a gain of 185 per cent over the 5818 programs operating in 1945, according to the Department of Labor.

■ VACUUM CLEANER OUTPUT CONTINUES TO CLIMB

CHICAGO—Factory sales of standard size household vacuum cleaners in 1946 set a new record of 2,289,441, 37 per cent greater than the previous record established in 1941. Monthly records were established successively in the last seven months of the year.

■ DEVELOP ALLOY TUBING FOR SYNTHETIC RUBBER INDUSTRY

BEAVER FALLS, PA.—A modified type of 18-8 silicon alloy, designated Croloy 18-8 Si, has been developed by the Babcock & Wilcox Tube Co. in co-operation with a large oil company for use in the synthetic rubber industry. Company metallurgists report the alloy retains ductile properties on long heating and is relatively inert chemically under alternating reducing and oxidizing conditions.

Prospects for Labor Peace Brighten

Opening sessions of steel wage discussions called "very satisfactory." Union more conciliatory than year ago. Feels loss of government support

WAGE contract negotiations now underway in the steel industry are proceeding with comparative amiability in contrast to last year's sharp conflicts. This is being cautiously interpreted as a good omen for a substantial measure of industrial peace in 1947 and avoidance of the work stoppages and resultant materials shortages that last year cost the metalworking industry an estimated $19 million in lost production, prolonged scarcities of all types of hard goods and contributed to the rising price spiral.

Preliminary negotiations between the United Steelworkers of America-CIO and the larger independent steel companies were called "very satisfactory" although they resulted in little news and practically no action. The early discussions between the independents and the unions were for the most part procedural and it appeared that both parties were awaiting the outcome of the negotiations with Big Steel, scheduled to start Jan. 24 in the William Penn Hotel in Pittsburgh.

Much of the lack of tension attending the current negotiations can be attributed to the absence of government interference and restraints. A year ago, practically all moves in the negotiations were affected by federal wage and price controls and by the administration's union-supporting policies.

Union Doesn't Set Exact Figure

Opening sessions in the negotiations with Bethlehem Steel Co., Republic Steel Corp., Jones & Laughlin Steel Corp., Inland Steel Co. and Youngstown Sheet & Tube Co. brought no clarification as to what the union means by its demand for a "substantial" wage increase. Union spokesmen scrupulously have avoided setting a definite cents-an-hour figure and thus have entrenched themselves in no position from which withdrawal might be embarrassing. This is in sharp contrast to their flat demand a year ago for $2 a day increase, "subject to no dickering."

Most observers believe the union will be glad to accept a moderate wage increase, will insist on a measure of union security, and will be satisfied with minor concessions on some of their other demands.

COMBAT PORTAL SUITS: Testifying before the Senate Judiciary subcommittee, Sen. Homer E. Capehart (Rep., Ind.), center, asked quick action to outlaw portal-to-portal pay suits. At left is Sen. Alexander Wiley (Rep., Wis.), chairman of the judiciary committee, and Sen. Forrest C. Donnell (Rep., Mo.), chairman of the judiciary subcommittee. NEA photo

Some union spokesmen admit they have no hope of obtaining any definite action on the guaranteed annual wage demand, although it will have a place in the discussions.

That the steel companies will present counter demands to the union is apparent. The line these counter demands will follow was indicated in the opening session of Inland Steel Co.'s negotiations when the company suggested the steelworkers accept a reduction in base pay rates to compensate for portal-to-portal pay requirements as interpreted under the Supreme Court ruling in the Mt. Clemens Pottery Co. case. As proposed by Inland, the new contract clauses would not affect the take-home pay of any employee. Any reduction would be directly offset by added portal pay.

Inland also called for contract clauses providing the union could be sued for contract violations, no-strike, no-picketing, and no-slowdown agreements and speeding up of grievance procedure.

The proposed contract clauses offered no form of union security, but the company said it would grant a no-discrimination and no-coercion provision. The company further proposed to eliminate compulsory unionism in the form of maintenance of membership clauses, but offered to grant a voluntary checkoff of union dues and initiation fees.

The union is keeping secret a special survey on the ability of the steel industry to grant a wage increase prepared for the steelworkers by Robert R. Nathan, former government economist who also prepared a general wage and price survey for the CIO several weeks ago and which has been the subject of considerable debate. The steel industry survey, union spokesmen said, will not be made public, but will be used to bolster union arguments during the negotiations.

Watching the basic steel wage negotiations are the steel fabricating companies, most of which produce no steel but which have contracts with the United Steelworkers, the electrical equipment industry and the automobile and parts manufacturers and other metalworking companies. These groups will be affected by the outcome in two ways: First, by the effect any wage increase in steel may have on steel prices, and second, by the influence the steel wage settlement will

have on wage negotiations in their industries.

A year ago, the United Steelworkers insisted that steel fabricators grant the same wage increases as were won from the basic steel producers. This confronted the fabricators with very serious problems. Prices of steel, their chief raw material, were raised an average of $5 a ton as result of the basic steel wage increase. Thus they were faced with both higher wage and material costs at a time when most of their products were under price control.

This year the union asked the fabricators to sign agreements that they would accept the contract terms agreed to by the union and United States Steel. The fabricators refused. Then the union proposed the fabricators agree to make whatever settlement is finally reached between the union and the fabricators retroactive. This the fabricators also refused.

It now appears that contracts of most fabricators will be extended indefinitely without any commitments to follow the wage pattern established in the basic steel settlement and without any provisions for retroactivity. Many of the fabricators contend they will insist upon individual company negotiations and will oppose the imposition of blanket wage provisions.

Several UAW-CIO contracts with automobile builders expired this week, Jan. 26 specifically, including those with Chrysler Corp., Briggs Mfg. Co., Packard and Hudson. Provisions of these contracts, however, call for their extension pending completion of negotiations on a new contract, the latter now being in progress. Jan. 15 was the deadline for exchange of demands and counterdemands, and the UAW Chrysler department acted just under the deadline to demand an across-the-board 23½ cents per hour wage increase, company-financed insurance and pension plans which would add another estimated 7 cents an hour.

General Motors' union contract runs to March 19, 1948, with the provision that no demands on wages or other economic issues shall be made before May 31 of this year. However, either party to the contract may ask for negotiations on wages or economic issues on March 19.

Contract between Ford and the UAW-CIO is of the one-year type and expires May 31 this year.

Negotiations with Chrysler so far have brought a list of 12 counterdemands from the company, none of which touches on wages. The counterdemands call, among other things, for a clause to guarantee union responsibility, another to compel the union to pay stewards for time spent on union business, and a third to preserve the open shop.

The United Electrical, Radio & Machine Workers soon will make demands for wage increases and a broad health and welfare program on the "Big Four" of the electrical manufacturing industry, General Electric, Westinghouse, General Motors' Electrical Division and Sylvania. Contracts with the 1300 smaller companies with which the union has contracts will not be reopened until negotiations are underway with the four large firms.

Shipments of Steel Products Continue at High Level

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period NOVEMBER - 1946

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production: Net Tons	Current Month: Production: Per cent of capacity	Current Month: Shipments (Net Tons): Total	Current Month: Shipments (Net Tons): To members of the industry for conversion into further finished products	To Date This Year: Production: Net Tons	To Date This Year: Production: Per cent of capacity	To Date This Year: Shipments (Net Tons): Total	To Date This Year: Shipments (Net Tons): To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	41	1	xxxx	xxxx	xxx	307,902	144,120	xxxx	xxx	3,296,009	1,506,586
Structural shapes (heavy)	12	2	9,421,550	328,129	45.9	355,719	xxxx	3,143,963	38.8	3,170,367	xxxx
Steel piling	4	3		27,672		30,482	xxxx	204,479		189,022	xxxx
Plates (sheared and universal)	29	4	17,080,770	410,706	29.2	491,984	26,186	3,939,320	25.2	4,012,461	242,755
Skelp	6	5	xxxx	xxxx	xxx	51,762	24,502	xxxx	xxx	402,194	184,472
Rails—Standard (over 60 lbs.)	4	6	3,657,000	187,635	62.4	196,768	xxxx	1,660,996	49.6	1,632,661	xxxx
—All other	5	7	392,000	14,331	44.4	13,207	xxxx	131,456	36.6	133,560	xxxx
Splice bars and tie plates	13	8	1,745,960	59,229	41.2	63,170	xxxx	567,935	35.5	594,701	xxxx
Track spikes	11	9	349,400	13,036	45.3	13,401	xxxx	127,638	39.9	132,587	xxxx
Hot Rolled Bars—Carbon	34	10	xxxx	683,043	xxx	580,526	73,701	6,341,079	xxx	5,204,722	657,491
—Reinforcing—New billet	16	11	xxxx	91,079	xxx	102,112	xxxx	868,340	xxx	960,715	xxxx
—Rerolled	12	12	xxxx	16,676	xxx	15,435	xxxx	131,032	xxx	131,152	xxxx
—Alloy	24	13	xxxx	175,719	xxx	171,088	13,685	1,620,795	xxx	1,383,946	117,948
—Total	41	14	22,326,160	966,517	52.6	869,161	87,386	8,961,246	43.9	7,680,535	775,439
Cold Finished Bars—Carbon	24	15	xxxx	133,073	xxx	130,123	xxxx	1,203,108	xxx	1,192,193	xxxx
—Alloy	23	16	xxxx	19,570	xxx	18,353	xxxx	200,776	xxx	180,157	xxxx
—Total	31	17	2,851,510	152,643	65.1	148,476	xxxx	1,403,884	53.8	1,372,350	xxxx
Tool steel bars	19	18	262,810	7,714	35.7	8,076	xxxx	91,472	38.0	88,455	xxxx
Pipe & Tubes—Butt weld	14	19	2,215,520	135,996	74.6	141,069	xxxx	1,287,363	63.5	1,214,850	xxxx
—Lap weld	9	20	730,200	32,825	54.6	35,263	xxxx	264,167	39.5	281,788	xxxx
—Electric weld	10	21	1,536,900	73,876	58.4	61,869	xxxx	715,306	50.9	612,889	xxxx
—Seamless	13	22	3,169,600	217,794	83.5	194,346	xxxx	2,019,749	69.6	1,776,640	xxxx
—Conduit (cap. & prod. incl. above)	6	23	xxxx	xxxx	xxx	10,630	xxxx	xxxx	xxx	90,917	xxxx
—Mech. tubing (cap. & prod. incl. above)	12	24	xxxx	xxxx	xxx	39,297	xxxx	xxxx	xxx	395,670	xxxx
Wire rods	26	25	7,293,670	436,315	72.7	89,876	27,116	4,053,913	60.7	942,643	320,693
Wire—Drawn	41	26	5,742,890	366,769	77.6	209,332	13,814	*3,232,610	61.5	*1,862,705	126,424
—Nails and staples	19	27	1,259,760	71,546	69.0	69,823	xxxx	563,737	48.9	562,062	xxxx
—Barbed and twisted	16	28	543,010	18,047	40.4	17,638	xxxx	190,707	38.4	187,931	xxxx
—Woven wire fence	16	29	1,121,060	32,986	35.8	35,230	xxxx	346,918	33.8	350,472	xxxx
—Bale ties	13	30	149,700	9,412	76.4	9,882	xxxx	86,159	62.9	90,383	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	83,422	137	xxxx	xxx	692,235	1,463
—Chemically treated	8	32	465,000	10,793	28.2	10,622	xxxx	116,060	27.3	112,314	xxxx
Tin and Terne Plate—Hot dipped	9	33	3,758,850	154,421	49.9	167,515	xxxx	1,661,157	48.3	1,755,633	xxxx
—Electrolytic	9	34	2,231,650	75,961	41.4	80,478	xxxx	804,587	39.4	813,571	xxxx
Sheets—Hot rolled	31	35	19,785,320	1,407,042	86.4	681,926	39,927	12,669,025	70.0	5,769,742	382,439
—Cold rolled	14	36	7,309,460	564,155	93.8	438,849	xxxx	5,046,999	75.4	3,696,125	xxxx
—Galvanized	16	37	2,924,130	129,835	54.0	138,796	xxxx	1,289,146	48.2	1,333,283	xxxx
Strip—Hot rolled	25	38	7,180,030	258,395	43.7	164,877	21,326	2,271,233	34.6	1,447,846	218,586
—Cold rolled	34	39	3,067,450	137,263	54.4	131,811	xxxx	1,225,674	43.7	1,185,244	xxxx
Wheels (car, rolled steel)	5	40	315,400	25,432	98.0	26,083	xxxx	223,226	77.3	227,729	xxxx
Axles	6	41	398,170	13,722	41.9	15,054	xxxx	121,814	33.4	117,814	xxxx
All other	3	42	169,510	3,869	27.7	702	xxxx	40,451	26.1	5,781	xxxx
TOTAL STEEL PRODUCTS	143	43	xxxx	xxxx	xxx	5,404,498	384,514	xxxx	xxx	48,233,169	3,758,857
Effective steel finishing capacity	143	44	64,648,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	143	45	xxxx	xxxx	xxx	94.4 %	xxxx	xxxx	xxx	75.5 %	xxxx

Important Changes Effected in Structural Shape Extra Lists

New cards include charges for certain size ranges where none formerly existed. Extras for splitting beams and channels, especially lighter sections, increased. Changes made in quantity and other charges

NEW extra card covering hot-rolled carbon steel structural shapes includes extras for certain size ranges where formerly none were charged, and in general size extras have been increased.

The base size range for standard angles is now 4 to 6 in., formerly 3 to 6 in. An extra of 10 cents per 100 pounds now applies on 3-in. standard angles and in range over 6 to 8 in.; for 9 x 4-in. section the extra is 20 cents.

The base size range extra for standard beams formerly was 3 to 15 in., and over 15 in., 10 cents was charged. An extra of 15 cents is now charged for size range 3 to 4 in., and 10 cents, 5 to 6 in. Size and section extras for H-beams have been advanced 5 to 20 cents. Revisions in size and section extras for wide flange beams also are noted.

Wide flange bearing pile section size extras have been advanced to 5 cents; light beams, joists and stanchions, 10 cents per 100 pounds.

Size and section extras for standard car and shipbuilding channels have been established as follows: 3 and 4 in., 15 cents; 5 to 8 in. inclusive, 10 cents; over 15 in., 10 cents. Formerly 3 to 15 in. inclusive was base; over 15 in., 10 cents. There is no longer a base size extra for special car building sections, with advances in extras of 10 to 20 cents noted.

Size extra for standard zees is 15 cents for 3 in.; 10 cents for 4, 5 and 6 in. Formerly 3 to 6 in. was base.

Extras for Splitting Increased

Extras for splitting beams and channels, especially for the lighter weight sections, have been increased. New extras have been established where splitting by gas cutting is necessary. It is to be noted that listed extras apply to splitting beams as well as channels.

Length extra of 30 cents is now applicable in range 60 to 80 ft, which was formerly within the base range. The base range is now 8 to 60 ft, with substantial increases noted for nearly all odd lengths.

Quantity extras now apply to under 4000 lb, against the former schedule of under 2000 lb. An extra of 20 cents is charged for under 4000 to 2000 lb inclusive; 40 cents, 1999 to 1000 lb inclusive; and 75 cents for under 1000 lb. For under 2000 lb the former respective extras were 25 and 50 cents.

Special cutting extras have been increased 10 cents except for milling. A new extra of 10 cents has been provided when length tolerances are specified either with tolerance "plus only" or "minus only."

Wording in the new extra card under heading "Extra for Cambering Beams" has been made to conform with that contained in the AISI manual for structural shapes.

Extras have been increased for federal specification QQS-751a and ASTM A-94. The high tensile grade of U. S. Navy specification 46-S-1 now reflects proper extra.

When location of tension or bend tests other than standard are specified, an extra of 15 cents is now charged; and there also is a new extra of 15 cents for hardness tests.

An extra of 60 cents for pickling is now charged; 20 cents for oiling of as-rolled surfaces for protective shipping coating. There is an extra of 5 cents per 100 lb, minimum charge of $15, when the purchaser specifies the material shall be protected from the weather when shipped in open car or where the purchaser specifies material to be shipped in box cars.

New extras have been established for special marking based on number of characters necessary over standard mill marking. The next revision of the AISI shape manual, section 4, will contain the new standard for marking. This extra is 5 cents for up to and including ten characters, 10 for more than 10 characters.

An extra of 10 cents is now applicable for outside inspection when additional handling for foreign or outside inspection is specified or required.

A special machine straightening extra of 25 cents minimum will affect all orders where closer than standard tolerances are required.

With few exceptions, all chemical requirement extras have been increased and base ranges revised. Extras for carbon and manganese are determined on the maximum of the specified range. The new card also lists chemical requirement extras for phosphorus and sulphur.

New extras have been established for bundling and loading. A bundling extra of 10 cents is now charged for one-ton lifts; 5 cents for over one-ton lifts. When the purchaser specifies or re-

50,000-LB CASTING: One of four belts for a caustic soda tank for Dow Chemical Co., Freeport, Tex., this 50,000-lb casting was produced by the Goslin-Birmingham Mfg. Co., Birmingham. Casting is 18 ft in diameter and 8 ft high. It will be cut in half for shipment

quires loading practice of under 5-ton lifts, the following extras apply: 1 net ton, 20 cents; 2 net tons, 15; 3 and 4 net tons, 10 cents.

Prices Raised and Extras Revised on Electrical Sheets

PITTSBURGH

CARNEGIE - ILLINOIS Steel Corp. has increased the price base and applicable extras on electrical sheets.

The new prices, base Pittsburgh only, for 24 gage electrical sheets, effective on shipments Jan. 27, are as follows: Field grade, up 30 cents to price base of $4.20 per 100 pounds; armature grade up 25 cents to $4.50; electrical, up same amount to $5; motor, dynamo and transformer 72, up 32½ cents to $5.75, $6.45 and $6.95, respectively; transformer 65, up 2½ cents to $7.65; transformer 58 and 52, up 22½ cents to $8.35 and $9.15, respectively.

Electrical sheet width extras in width range under 24 to 2-in. wide have been revised upward 35 cents in some instances, and in others no revision has been made. Greater increase in width extras have been established for under 2-inches wide. Width extra range classifications have been increased from 4 to 5 divisions. In widths over 32 to 48-inches minor revisions in width extras also are established.

Length extras have been established for over 124 to 144 inches; under 72 inches the extras have been increased in some cases up to as much as 15 cents, with base range in length being 124 to 72 inches against 124 to 60 inches formerly.

Some of the extras for oiling have been advanced, up to 20 cents in a few instances. Previously there was a flat oiling extra of 10 cents regardless of thickness; now increases have been put into effect on lighter gages.

Pickling before annealing extras have been established for field, armature and electrical grades.

Coiling extra of 25 cents, heretofore applying for coils under 24 inches wide, now apply for all widths.

Order quantity extra has been increased from 25 to 50 cents for under 7000 pounds. The item quantity and packaging extras are the same as those recently announced in the hot and cold-rolled sheet extra cards.

Pacific coast arbitrary price base on all steel products has been discontinued

(*Please turn to Page* 132)

Metallics Output in 1946 Valued At $1900 Million, 4% Under 1945

Decrease attributed to strikes, manpower shortages and scarcity of equipment. Gold output runs counter to trend and gains 54 per cent. Sharp drops noted in production of alloying elements and nonferrous metals

TOTAL value of metallic products produced in the United States and Alaska during 1946 was $1900 million. This figure, estimated by the Bureau of Mines, represents a drop of 4 per cent from $1975 million, the value set for metallics output in 1945.

Production of the various metals in 1946, with the exception of gold, was generally at levels 10 to 25 per cent below those of 1945. Gold was unique among the principal metals, in that it achieved a net production gain in 1946 over 1945 of about 54 per cent. The general decreases were largely attributable to strikes, chronic manpower shortages resulting from the delayed return to the mines of skilled workers demobilized from the armed forces, difficulties in obtaining new equipment and supplies, and the necessity for assigning a greater than normal part of the labor force at the mines to development work.

Strikes in the steel and allied industries resulted in substantial production declines for all ferrous materials during 1946. Production of steel ingots and castings dropped 18 per cent, to lowest level since 1939. Output of alloy steels declined twice as sharply as other grades. Pig iron and iron ore production decreased approximately 15 and 18 per cent, respectively.

Output of Alloying Metals Falls

Among alloying elements, molybdenum's production in 1946 was at 50 per cent the 1945 rate; vanadium output was 65 per cent less, and chromite declined 75 per cent. High-grade manganese ore (35 per cent or more manganese) and low-grade ore (5-10 per cent) showed losses of about 16 and 43 per cent, respectively, but medium-grade ore (10-35 per cent) made a gain of about 62 per cent in output. Production of tungsten concentrates declined for the third consecutive year.

Widespread strikes at nonferrous metal mines, smelters and refineries throughout the first half of 1946 caused setbacks in the output of copper, lead and zinc that could not be recouped. Smelter output of copper from domestic ores fell off fully 25 per cent in 1946 as compared with 1945. The effect was less drastic on refined lead and slab zinc, the production of which from domestic ores decreased about 12 and 8 per cent, respectively.

Total output of primary aluminum in 1946 was about 16 per cent less than in 1945, but by the end of the year the industry was producing at a rate 10 per cent greater than in 1945. There was no output of primary magnesium metal in the first five months of 1946 because stocks were more than ample.

The interruptions in nonferrous smelter operations in 1946 decreased the recovery of by-product cadmium, bismuth and arsenic about 25, 35 and 50 per cent, respectively, compared with 1945. Mercury output was down 25 per cent and antimony more than 50 per cent.

Total value of the mineral fuels in 1946 was $5700 million, compared with $5212 million in 1945—an increase of 9 per cent. This overall rise was caused primarily by new production records in all branches of the petroleum and natural gas industries in 1946. Coal output declined in the bituminous industry but increased in the anthracite.

Anti-Trust Action Taken Against 18 Screw Makers

A patent-holding company, nine screw manufacturers and eight screwdriver and bit manufacturers have been charged by Department of Justice with violating the anti-trust laws through price-fixing, patent-pooling and other trade restraints.

The government, in a civil suit filed in U. S. District Court at Chicago, alleges the defendants since 1933 had used patent licenses on screws and screwdrivers to "cloak" a price-fixing scheme through which identical prices were fixed on the sale and resale of the products.

The suit also charged the defendants set up a cartel arrangement whereby domestic licensees of the patented items agreed not to sell the screws or screwdrivers out of the United States and that foreign licensees agreed not to export items into the United States. Also, it was alleged, an agreement existed among the defendants not to manufacture any type of screws which would compete with the patented type named.

Tool Builders Expect Fair 1947 Volume Despite Market Handicaps

Materials and components shortages reported less acute but competition provided by government surplus equipment sales is being felt. Hesitant attitude of industry on plant expansions also curbing sales

ACHIEVEMENT in 1946 of a new peacetime record in dollar volume of machine tool shipments despite many formidable obstacles lends hope that current handicaps will be overcome sufficiently so that 1947 shipments, while they may not equal those of 1946, will rank well above prewar levels.

Shipments in 1946 are placed at $325,448,000 by the National Machine Tool Builders' Association, Cleveland. While this was a decline from the $407,155,000 in 1945 it is considerably above the $200 million of 1939.

The new peacetime record was set in 1946 despite severe shortages of materials and components and a growing competition from "bargain sales" of government surplus machine tools. While the materials and components shortages are a smaller factor today, competition from surplus sales still remains. Another current handicap is the hesitation of industry to make new plant expansions and order new machine tools in the face of rising construction costs, unbalanced production costs, and predictions of a recession.

These handicaps are reflected by the National Machine Tool Builders' Association reports, which show that new orders were on a downward trend after April of 1946.

Likewise on a downward course have been order backlogs, which began declining after July, with the latest drop putting December about 5 per cent below November.

Among current readjustments in the machine tool industry is the reduction by the Bullard Co., machine tool builder at Bridgeport, Conn., of its personnel, dismissals totaling 600 employees. "There are two factors principally responsible for this reduction," said E. C. Bullard, president and general manager. Our company, as well as others in our industry, has been severely handicapped by the sale of war surplus machine tools at extremely low prices by the War Assets Administration. In addition, uncertainties all of common knowledge and too numerous to list have undoubtedly slowed capital investment programs in many industries."

He pointed out that the Bullard company has many new developments ready to meet the demands of industry. Also, he said, "to maintain employment on as high a level as possible along with our machine tools we are offering subcontracting facilities to factories which have an immediate need for production but which do not wish to expand their own facilities for the moment."

While sales of government surplus machine tools already have made themselves keenly felt, the great bulk of government-owned tools remains yet to be declared surplus. However, it is the belief that a great many of the tools eventually will be scrapped.

In view of the continued progress in industrial methods and machinery, some people have questioned the wisdom of storing machine tools for use in event of another war, believing that the tools would be outmoded by the time they might be needed. However, spokesmen for the industry point out that the machine tool industry is small in comparison with all United States industry and that the nation might meet with disaster if all industry had to wait for tools to be built. Machine tools from storage, even though they may not be up-to-date, would fulfill a necessary function and perhaps would save countless lives, it was pointed out.

Although efforts are being strengthened to dispose abroad of some of the U. S. government's surplus machine tools, there have been reports that foreigners are afraid of the surplus, their fears being that machines might not be complete or might have been worn to the extent that they will not long be serviceable.

Meanwhile, orders from foreign countries for new machine tools continue steady. Likewise, backlog of orders from foreign purchasers remains unchanged.

With respect to domestic business, installment purchases are reported increasing measurably in some areas principally because big plants are pretty well tooled up, with demand now centering in new or smaller enterprises whose financial resources are limited.

Government Factory in South Bend Is for Lease or Sale

Proposals for the sale or lease of the government-owned land and building known as Plancor 171 in South Bend, Ind., will be received Feb. 18, at 327 S. LaSalle St., Chicago. The plant was operated during the war by Bendix Aviation Corp. for the manufacture of metal aircraft parts.

SIMMONS INDUSTRIAL DEVELOPMENT: A project long planned by Charles A. Simmons, president of Simmons Machine Tool Corp., is rapidly nearing completion at Albany, N. Y. Besides the two buildings at the extreme right, occupied by the Simmons Machine Tool Corp., and its subsidiary, the Simmons Fastener Corp., the development includes nine buildings, six of which have been completed and leased and three of which are being built

Trailer Builders Asked To Give Ample Lead-Time on Supplies

Industry's 1947 production goal of 100,000 to 150,000 units seen attained if suppliers are granted sufficient time to procure raw materials and components. Indications are 20 per cent more steel will be available to the industry

PRODUCTION of truck-trailers this year is expected to total 100,000 units, and possibly may range as high as 150,000. At a factory average sale price of $2000 per trailer the value of the industry's production would amount to at least $200 million and perhaps reach $300 million.

Such a production would far exceed the previous all-time peacetime record of approximately 70,000 in 1946. However, the truck-trailer industry during 1944 built 185,349 military units and 24,092 civilian units.

The 100,000 figure for 1947 was put forth by John E. Graham, head of the automotive department, Office of Temporary Controls, in an address at the recent annual meeting in Memphis, Tenn., of the Truck-Trailer Manufacturers Association Inc. Mr. Graham said the 100,000 figure was based on a test survey of trailer production plans and that the figure is a conservative estimate of programmed output. There were indications, he pointed out, that the output may go even as high as 150,000 units.

Big Question Is Supply Situation

However, in attainment of even the lower figure the important question is whether suppliers can allow the trailer industry materials and components to carry out their plans, Mr. Graham pointed out. The outlook, he said, is for 20 per cent more steel for the industry in 1947. This would be sufficient for production of about 84,000 trailers. Production of 100,000 units would require 35 per cent more steel, he said. On the other hand, he noted that some aluminum and proportionate amounts of other materials such as softwood plywood will be available.

Suppliers were confident they could make available the necessary materials and components, provided they are given sufficient "lead time" on orders in in which to procure raw materials, and provided orders placed are firm and not subject to cutbacks or partial takings.

Relative to the steel supply for the trailer industry, Bennett S. Chapple Jr., assistant to the vice president in charge of sales, United States Steel Corp., said that more sheet and strip would be available, barring strikes or other stoppages. The trailer industry's sheet and strip steel need, said Mr. Chapple, approximates 200,000 tons yearly, which is small in relation to overall sheet and strip production. Explaining, however, that huge demands have caused steel producers to adopt an allocation system based on 1936-1939 production, Mr. Chapple said that truck-trailer production has more than doubled that of prewar years and that "newcomers" cannot expect to obtain metal at the expense of long-time customers of the steel industry.

In convention panel discussions, four suppliers agreed that providing axles for building 100,000 trailers this year would not be impossible. One supplier said his company's production has risen 50 per cent and "we could make another 50 per cent increase without trouble." Another supplier said "I can go along with the others as to axle supplies but our whole industry should have at least 90 days lead time on orders to give us a chance to obtain raw materials."

A panel speaker from the nut and bolt industry said that in the second half of this year "we will be able to supply practically everthing needed in the truck-trailer industry." He emphasized, however, that "lead time is absolutely necessary, particularly on raw stock in the smaller diameters."

A brake manufacturer said his company was "built up to produce 90,000 sets of brakes in 1946, but actually produced only about 65,000 sets, and a figure of 100,000 doesn't bother us at all."

Makers of springs pleaded for "lead time" and "realistic order schedules" but gave assurance that "if trailer makers will spread out their requirements over a reasonable time there should be no problem in getting springs." It was pointed out that the trailer industry, on a 100,000-vehicle production basis, would need about 114,000 tons of springs, or less than 10 per cent of all automotive needs.

Outlook for supplies of wheels, trailer supports and fifth wheels also was optimistic.

Officers elected by the Truck-Trailer Manufacturers Association for 1947 were: President, J. L. Glick, Truck Engineering Corp., Cleveland; executive vice president, John C. Bennett, Utility Trailer Mfg. Co., Los Angeles; eastern vice president, N. A. Carter Jr., Carter Inc., Memphis, Tenn.; and treasurer, W. E. Grace, Hobbs Mfg. Co., Ft. Worth, Tex.

Thirty-Four Firms to Take Part in Magnesium Exhibit

The magnesium exhibition at Wright Field, Dayton, O., will find 34 companies exhibiting thousands of examples of magnesium applications when the show gets under way Feb. 18-20. Originally scheduled for Feb. 4-6, the exhibit was changed to the later date by the co-sponsors, Air Materiel Command Headquarters of Army Air Forces and the Magnesium Association.

Applications ranging from precision castings to truck bodies and airplanes will be on display to the Armed Services and leading executives and engineering representatives of American industry.

Calendar of Meetings . . .

Jan. 27-30, Associated General Contractors of America Inc.: 28th annual convention, Stevens Hotel, Chicago. Association headquarters are in Munsey Bldg., Washington 4, D. C.

Jan. 27-30, Electrical Engineering Exposition: 71st Regiment Armory, Park Ave. and 34th St., New York.

Jan. 27-31, American Society of Heating & Ventilating Engineers: Seventh International Heating & Ventilating Exposition, Public Auditorium, Cleveland. International Exposition Co., Grand Central Palace, New York 17, is show manager.

Feb. 10, American Supply & Machinery Manufacturers' Association Inc.: Third Regional meeting, Peabody Hotel, Memphis, Tenn. Association general manager is R. Kennedy Hamson, 1108 Clark Bldg., Pittsburgh.

Feb. 13-14, American Hot Dip Galvanizers Association Inc.: Annual meeting, Netherland Plaza Hotel, Cincinnati. Stuart J. Swenson, First National Bank Bldg., Pittsburgh, is association secretary-treasurer.

Feb. 17-24, American Road Builders' Association: 44th annual convention, Palmer House, Chicago. Association headquarters are in the International Bldg., Washington.

Feb. 18-20, Magnesium Exhibit, sponsored jointly by the Magnesium Association and the Army Air Forces, Wright Field, O.

Feb. 24-28, American Society for Testing Materials: Spring meeting, Benjamin Franklin Hotel, Philadelphia. Society headquarters are at 1916 Race St., Philadelphia 3.

Mar. 2-5, American Society of Mechanical Engineers: Spring meeting, Mayo Hotel, Tulsa, Okla.

March 17-19, American Institute of Mining & Metallurgical Engineers: World Conference on Mineral Resources Waldorf-Astoria, New York. Headquarters of the institute are at 29 West 39th St., New York 18.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Eighteenth Congress shaping legislative program independently and cautiously. Progress slowed by shortage of skilled specialists as advisers. No legislation expected to be adopted before March, if then

THE COLLECTIVE personality and character of the 80th Congress is being unveiled as the lawmakers complete their organization. On the whole, the impression of the new Congress is favorable.

Preliminary organization has been executed with smooth co-operation. The 80th Congress has abandoned the custom of its predecessors since 1933 of taking legislative cues from the White House. It is shaping its legislative agenda independently but with caution.

To many, it may appear that Congress is proceeding slowly. No important legislative action is expected before March, if then. The lack of speed to a considerable extent results from an acute shortage of skilled advisers of a caliber and type acceptable to majority leaders.

The Republicans say that during the 16 years they sat in the minority, the congressional advisory staffs were loaded largely with so-called "liberals"—many of whom were outright New Dealers. A few of the employees are being held over from the 79th Congress, but the great majority are to be replaced. The Republicans say they are looking for men of stature to fill the advisory positions. To be acceptable, however, they must have a reputation for being fair and open-minded and not wedded to any "isms."

It is slow work to find such men. Of 210 needed to service properly the Congress under the Legislative Reorganization Act of 1946, only some 40 so far have been engaged. Of these some 20 are members of the Legislative Reference Service of the Library of Congress, while 20 or so have been appointed to congressional committee staffs. The Legislative Reference Staff wants at least 10 more men of specialized training and satisfactory background. But it is in the committees that the shortage is most acute. At least 160 more specialists are needed to enable the committees to function effectively and effectually.

Dr. E. S. Griffith, head of the Legislative Reference Service, is proud of the staff he has been able to assemble. One of his bright stars is Dr. E. A. Goldenweiser who, as head of the research staff for many years of the Federal Reserve System Board of Governors, is well and favorably known to business. He is the senior specialist on money and banking. Another is Francis Wilcox, foreign relations specialist, who now is on loan to Senator Vandenberg, chairman of the Senate Foreign Relations Committee. Another is Gustave Peck, a government career labor expert who first won recognition for the understanding manner in which he served as executive secretary of the Labor Advisory Board of the old NRA. Another is Dr. Meyer Jaconstein, on leave from the Brookings Institution, who serves the Legislative Reference Service as economics research counsel.

In the Senate, George H. E. Smith, staff director of the Majority Policy Committee, is serving as a clearing house for candidates for posts on the staffs of the 15 standing committees. Mr. Smith joins Dr. Griffith in saying that many men with experience in industry and business could fill these posts with great usefulness. But he adds that no mere job seekers will be considered.

"The committees need specialists," Mr. Smith told STEEL, "and when I say specialists, I mean specialists. We are looking only for top-notch people who can assist Congress in solving some very difficult legislative problems."

The salaries that can be paid, comments Dr. Griffith, are not usually attractive to experienced businessmen. They range up to $10,000 annually; "when we find a man to whom we could offer $10,000, we usually find he is worth $25,000 in private industry," Dr. Griffith told STEEL. "But there should be many men, particularly men of wide experience who have reached or are nearing the retirement age, who would find a big measure of compensation in the pride of rendering public service."

GARDNER TAKES OATH: O. Max Gardner, former under secretary of treasury, is sworn in as ambassador to England by Chief Justice Fred M. Vinson. Looking on is retiring Secretary of State James F. Byrnes. NEA photo

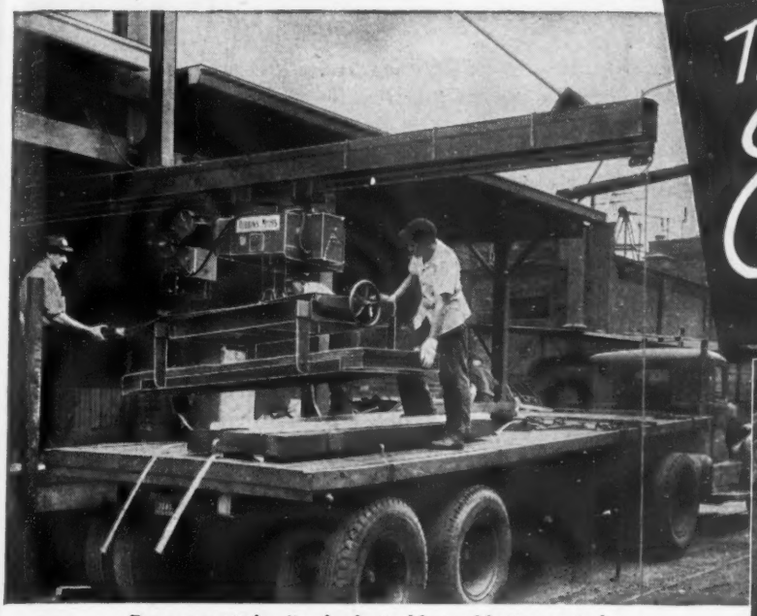
House Plans Similar Committee

In the House, the task of finding staff advisers now is up to each individual committee. House Republican leaders, however, are planning to organize a Majority Policy Committee along the lines of the Senate committee. Such action automatically would set up a comparable clearing house to simplify the task of finding and employing committee staff members.

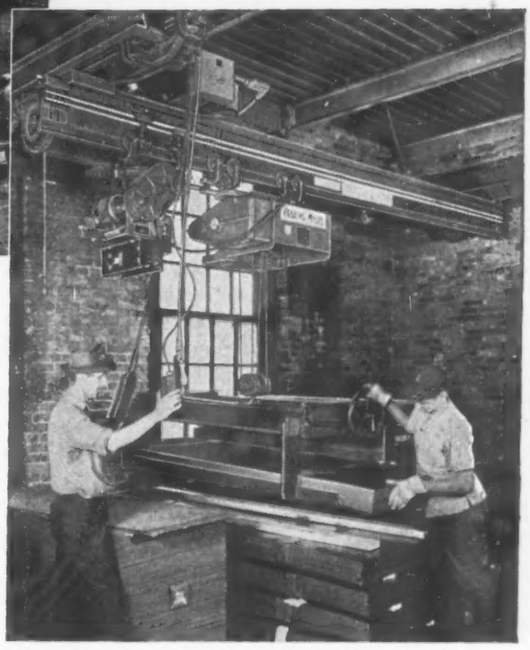
The first legislative recommendation to the Senate well may come from the Judiciary subcommittee which has been holding hearings on the Wiley, Capehart and Gwynne bills to discourage portal pay suits, and excessive awards, as a result of the Supreme Court's decision in the Mt. Clemens Pottery Co. case. Sen. Forrest C. Donnell (Rep., Mo.), who, as chairman of the subcommittee, has been in charge of the study, is in the habit of acting as rapidly as circumstances permit. He is expected to come up with recom-

HANDLING STEEL

The Easy Way!

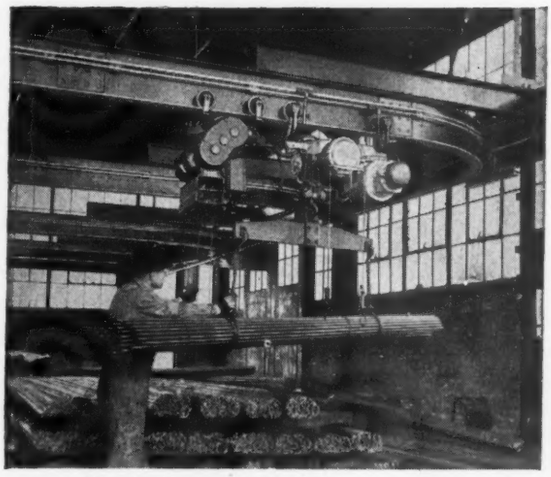


Power operated unit unloads steel by pushbutton control



Electric hoist with special hook, handles coils to process.

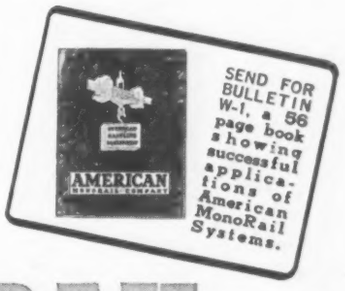
Power crane accurately spots 2-ton loads.



MonoTractor and 3-Ton hoist moves bar stock.

This tough job is made easy from start to finish —unloading stock from truck, to storage, to machines, to shipping—American MonoRail Systems, to fit any budget, afford faster handling, accurate spotting, reduced fatigue, added safety and greatly reduced damage.

American MonoRail Equipment saves one company $20 on every truck unloaded; another saved $150 in the first four months. With thousands of installations to draw from, American MonoRail Engineers are well qualified to offer solutions involving overhead handling equipment. This service is offered without obligation.



THE AMERICAN MONORAIL COMPANY

2119 HALSTEAD AVE. ● CLEVELAND 7, OHIO

mendations sometime in early February.

The program of the Senate Labor & Welfare Committee is typical of the approach on new legislative problems in the 80th Congress. In preparing to start a five-week series of hearings on Jan. 23, Chairman Taft made it clear that the committee does not know what sort of a bill, or bills, it will evolve: "If we knew that, we would not have to hold hearings," he said. Abandoning the previous custom of building the hearings around certain favored bills, Senator Taft said the whole matter of labor law will be explored, after which the committee will meet in executive session and draft proposed legislation.

The accomplishment of the War and Navy Departments in reaching "full and complete agreement" on a plan to unify America's armed forces has caused immense relief in Congress. Instead of striving for a middle course between conflicting programs, the two Armed Services Committees now can study the plan evolved by the services and vitalize it, or some version of it, with needed legislation. Early impressions are that the initial plan can be modified by eliminating some duplications and overlapping in order to reduce expenses.

Seek Solution to Depressions

Republican dissatisfaction with President Truman's first Economic Report probably will result in an important study by the Joint Committee on the Economic Report. The joint committee wants to seek out, if possible, an answer to this question: How can we avoid or mitigate, after World War II, the disastrous depression which always has followed major wars in the past? Majority feeling among the joint committee membership is that the Truman report placed too much stress on such matters as social security, housing, etc., which under today's conditions are regarded as belonging in the field of welfare rather than in that of economic problems.

Various investigations are in sight to get answers to such questions as: What did President Roosevelt do with his secret wartime fund of millions of dollars? What was the wartime reason to justify our construction of the Rama road in Nicaragua at a cost of $4,000,000? Why did the Treasury order 3-inch pins at 34 cents each from a middleman who sublet the contract to a manufacturer at 3 cents per pin? Should the authority of the Maritime Commission, expiring Feb. 28, to operate some 445 ships be extended, or should this business be turned over to private firms? How can disposal of government-owned surplus property be expedited?

Some Republican threats to wreck the State Department's program to negotiate reciprocal trade treaties this year with 18 countries will not materialize, on the basis of present indications. The Republican leadership has agreed that reciprocal trade agreements must be encouraged as a part of our general policy of promoting friendly relations and a common level of prosperity throughout the world. At the same time, notice has been served on the State Department by Senator Vandenberg that Congress will curb President Truman's tariff-cutting powers "if plans to trim tariffs on 800 commodities are carried through." There may be some interesting developments in relation to tariff policy in the next few weeks.

Philippines Relaxes Customs

To facilitate movement of imports from the United States, the Philippines government has relaxed the order that certificates of origin covering articles exported from the United States must be sworn to before a collector of customs in the United States or his deputy. American exporters and trade organizations shortly after began to report difficulties and delays in meeting this requirement. Under Administrative Order No. 24 of the Philippine Department of Finance, Philippine customs officers now will accept certificates of origin sworn to before a notary public.

Further Improvement Needed

Robert Heller, Cleveland industrial engineer whose report entitled "Strengthening the Congress," issued in 1945, generally is given considerable credit for stimulating the thinking that resulted in the congressional reforms provided for in the Legislative Reorganization Act of 1946, just has issued a progress report. In it he takes the position that the job of strengthening the Congress is only about half done.

The reduction in the number of committees from 33 to 15 in the Senate and from 48 to 19 in the House is, in his opinion, "a vital step forward, constituting the most important single accomplishment under the act."

A pressing need, says Mr. Heller, is a revision to provide for establishment of majority and minority policy committees "which would enable the people clearly to understand party policy on major issues. . . . The present steering committee system is not strong enough to assure productive co-operation between the Republican and Democratic leaders—no matter how well-meaning they may be. The formation in each house of majority and minority policy committees is the answer."

One of the great present needs is the elimination of the filibuster, says Mr. Heller. A primary danger in the next two years is legislative inactivity resulting from having a Democratic executive and a Republican Congress. "It therefore becomes imperative that any obstructions to the enactment of legislation by majority vote be removed."

Mr. Heller approves the act's changes with regard to fiscal policy as "a long step forward," but reiterates his original contention that the majority policy committee, made up of each major standing committee chairman, would be in the best position to determine overall fiscal policy and to assure that it accorded with legislation stemming from all standing committees.

Sign Accord on Enemy Patents

The 12 nations that recently signed the Accord on German Patents are on record as opposed to permitting these patents to be used as barriers to international trade, according to United States Patent Commissioner Casper W. Ooms in the February issue of *Federal Science Progress*, a Commerce Department magazine.

The nations joining in the accord are Australia, Belgium, Canada, Czechoslovakia, Denmark, France, Luxemburg, Netherlands, Norway, Union of South Africa, United Kingdom and the United States. Other nations will sign later. Each signatory nation agrees that the German patents which it seized has been or will be dedicated to the public, and will be continuously offered by royalty-free licensing to nationals of all the signators.

As a result, in any signatory country, the American businessman may freely market any article covered by a patent formerly German-owned. Usually he needs no license whatever. Where a license is required it is merely a formality and no payment of royalties is required.

Some patents are subject to sales or exclusive licensing agreements involving non-enemy countries; these arrangements are being respected. Anticipating a need for answering questions about such arrangements, the members of the accord have agreed to pool information on those patents that are subject to outstanding encumbrances and the nature thereof. The French government agreed to provide facilities for receiving and distributing such information. It also will collect lists of patents held by the signatory nations which now are available for royalty-free licensing.

American businessmen seeking detailed information can get it by writing to Bennett Boskey, adviser on enemy property, Division of Economic Security, State Department, Washington 25, D. C.

American Can To Allocate Tin Plate to Users

Can buyers told of program to distribute available supply of metal as equitably as possible. Container demand up 25%

PLAN for allocation of tin plate in 1947 was presented to representatives of trade associations of nine major industries by the American Can Co. at a recent meeting in New York.

D. W. Figgis, American Can Co. president, said the plan is the most efficient and equitable one that could be devised under circumstances that are unique in the container industry's history. It was made necessary by the fact enough sheet steel cannot be produced in 1947 to meet the full metal container requirements of canners, packers and manufacturers of packaged products. While the steel industry has new tin plate facilities under construction, Mr. Figgis said, these will not be completed in time to produce the volume required.

Growth of the industries served by American Can Co. has resulted in an overall increase of approximately 25 per cent in demand for metal containers between 1941 and 1947, he estimated.

Plan's Flexibility Stressed

Outlining the plan, Mr. Figgis emphasized that it is highly flexible in nature for two reasons. First, its formulation presented tremendous obstacles because of the physical task of determining the exact requirements of individual customers for the full year. Second, the company could not approach allocation in the same way that the government did up to the time that it removed restrictions Dec. 27 on products and quantities that could be packed in tin plate. The government was able to establish priorities, based simply on its appraisal of the relative "essentiality" of products.

The allocation plan offers customers nine alternatives in determining the base on which their quarterly allotment of tin plate is to be figured. In general, the alternatives are based on historical usage of containers.

Customers have their choice of one of four base years for estimating the amount of plate they are entitled to in 1947. In selecting one of these years they may take only one of the alternative applications which works out to their best advantage.

Mr. Figgis said the plan should provide equitable distribution of cans to all customers.

For example, a company which had been restricted or prevented entirely from packing in metal during the war emergency, could select either 1940 or 1941 as its quota year. On the other hand, a company which had been unrestricted by government controls and which had experienced sharp advances in business would be unduly penalized if 1945 and 1946 were not also offered as alternative quota years.

Mr. Figgis said that the company's entire sales staff is engaged in ascertaining from each individual customer the alternative he prefers for his own business and what his volume quota will be under this alternative. As soon as these data are assembled the company will balance the total of all quotas against anticipated quarterly receipts of tin plate. Then it will be possible, Mr. Figgis said, to announce a percentage figure applicable uniformly to the quota of each customer. The percentage may vary from quarter to quarter, depending upon the indicated deficiency of tin plate, Mr. Figgis added.

SKY GIANT: This is the first official picture of the Army Air Forces' XC-99 cargo and troop transport, nearing completion at Consolidated Vultee's San Diego, Calif., plant. The double-deck plane is capable of carrying 400 troops, or 335 litter patients, or 100,000 lb of cargo. Plane is 182½ ft long, 57½ ft high, has a wing span of 230 ft and is powered by six 3000-hp Pratt & Whitney pusher type engines

Shipments of Metal Cans Continue Seasonal Decline

Shipments of metal cans continued their seasonal decline in November and dropped to 192,134 tons, 26 per cent less than the 258,763 tons moved in October, the U. S. Bureau of Census reports. However, the November, 1946, shipments exceeded by 7 per cent the 180,297 tons shipped in the corresponding month of 1945.

Report Urges Development Of New Mineral Resources

Warning that reserves of metals and minerals in the United States were depleted by the unprecedented high production during the war years, the winter issue of *The Index*, the quarterly publication of New York Trust Co., New York, stated that "the security and prosperity of the nation call for a continuing appraisal of its metal and mineral resources, together with a program of research and development that will guarantee a supply sufficient for commercial use and for defense."

Factors which have discouraged development of marginal reserves, the report stated, are prices which were held at artificially low levels during the war and manpower shortages.

In commenting on the future, the report said: "There seems to be ample ground for the belief that further exploration by the industry will uncover additional reserves. In addition, research and improved technology will no doubt continue to reveal ways by which marginal resources may be used to better advantage. A more intensive prosecution of a conservation program that will prevent the waste of natural products is indicated."

British Steel Industry Expects 1947 Output To Exceed 13 Million Tons

Some works will be converted to oil firing to conserve coal. Possibilities of increasing exports are under constant review. Home demand still exceeds supply. Transport, fuel and scrap shortages are primary retarding factors

BIRMINGHAM, ENG.

PRODUCTION of steel ingots and steel castings in 1946 totaled 12,693,000 gross tons, compared with 11,824,000 tons in 1945 and 10,398,000 in 1938. The 1946 figure represents the substantial achievement of the goal of 12,750,000 tons in spite of fuel and transport difficulties. Output of pig iron in 1946 was 7,761,000 tons compared with 7,107,000 tons in 1945 and 6,761,000 tons in 1938.

Immediate prospects are overshadowed by the shortage of coal. Already some works in the Midland area have had to close for a few days or shorten the working week and it is anticipated that these conditions will persist until the end of the winter. Coking fuel is scarce and foundries may go short on this account. To meet the fuel difficulty, steps are being taken to convert to oil firing at works where this can be done satisfactorily. One ton of oil is stated to be equal to about two tons of coal; so that from one point of view a national service may be rendered by effecting a considerable saving in the tonnage of coal used by the industry. The expectation is that capacity using about 400,000 tons of oil will have been converted by the end of the first quarter of 1947. By the end of the year the industry expects to be using oil at the rate of a million tons per year. This will be of great advantage during coal shortages, though, of course, oil has to be imported.

Sees High 1947 Ingot Output

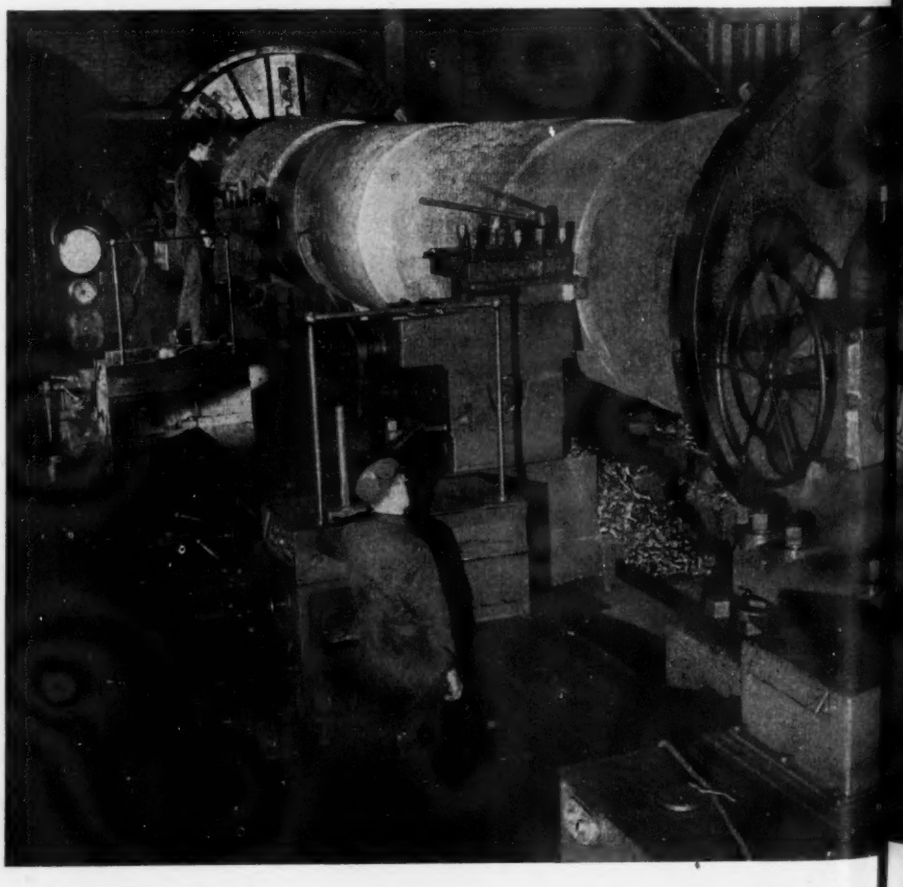
The British Iron & Steel Federation forecasts the production of between 13 and 13½ million tons of ingots in 1947 and indicates that under favorable conditions, assuming adequate supplies of fuel, transport and scrap are available, 13¾ million tons could be produced. The possibilities of increasing the export of steel are under constant review so as to reduce the sacrifice of overseas goodwill now being made in favor of home consuming industries. The federation points out that the government allocation system is capable of improvement. "It is the steel industry's acknowledged function," it says, "to insure that the tonnage available is as large as possible, but where it goes is determined solely by the allocations to government departments. They decide who is to have steel and how much." It is believed that in the anxiety to secure material consumers have duplicated orders and steps are being taken to check this practice. The over-riding fact is that new capacity is now in process of construction which will enlarge output by two million tons per annum, and although a permanent increase in domestic demand is regarded as a certainty, confidence is expressed that "the overall flow of steel to the consuming industries during 1947 will not be far out of line with their ability to use it."

Meanwhile the position of supply and demand has not altered appreciably during recent weeks. Transport delays and fuel shortages have hindered producers. Even when material has been ready for dispatch it has not been possible to get it away, often because of the absence of railroad cars. Sheet mills are booked up for the next six or eight months. Extensive demands are being made on plate mills. The re-rollers are still short of semifinished material though Australia has been sending in larger quantities recently, and it is hoped that the dominions will increase the supply during 1947. It is unlikely, however, that users of sheets, such as the automobile industry and the producers of steel houses, will get all they need during the present quarter.

Big quantities of steel will be required for shipbuilding. In Scotland the principal firms have enough work to keep them busy for at least two years, but this is dependent on the supply of raw materials. In the Clyde district the tonnage launched in 1946 consisted of 96 vessels of a total of 343,500 tons which was 86,000 tons higher than in 1945. With few exceptions the new ships were intended to replace cargo tonnage lost during the war.

Pig iron users are working on very narrow margins of stocks. Demands for light castings are urgent but foundries are not yet working to 100 per cent capacity because of lack of labor.

The call for galvanized sheets continues in excess of demand. Export



prices have recently been increased owing to the recent advance in the price of zinc.

FOREIGN NOTES..

Argentina has instituted a permit requirement for importation of industrial machinery of certain types designed to restrict imports to replacements of worn-out mechanical equipment and to types not produced in Argentina.

—o—

Estimated requirements for tractors in Venezuela for 1947 total 321 new units.

—o—

Municipal authorities of Caracas, Venezuela, are reported to be contemplating construction of a metropolitan subway system. Promoters estimate the project will require $21 million and from four to five years for completion.

—o—

Planned construction projects for the Windward Islands group of British West Indies include a steel or concrete pier, to cost $70,000.

—o—

Danish purchases of automotive equipment in the United States in the fiscal year ending next Mar. 31 total 1,900,000 crowns at a rate of 4.81 crowns to the dollar. Purchases include 231 trucks and commercial vehicles. Expenditures for fiscal year 1947-48 will reach 1,500,000 crowns.

—o—

Opening of the first iron mine in the area between Damme and Holdorf, Germany, is reported. Discovered 36 years ago, the deposit is described as among the most valuable in Germany.

—o—

Argentina has reduced the exchange rate for importation of agricultural machinery from 455 pesos to 422 pesos per $100.

—o—

Unification of railroad gages between various states in Australia has been expedited by passage of an Australian government bill on railway standardization. Estimated cost is £50,878,000.

—o—

Yugoslavia has set up a government subsidiary for importation of farm machinery. Home manufacture has also started on special mountain threshing machinery.

—o—

Under terms of an agreement between Czechoslovakia and Yugoslavia, Czechoslovakia is to supply machinery, railway rolling stock, chemical, metallurgical and electro-technical products to Yugoslavia, while the latter country will furnish ores, lumber and farm products.

—o—

German iron and steel foundries in recent years have profitably utilized from one-half to two-thirds of their total blast furnace slag.

This 55-in. center lathe, one of the the largest in England, is shown rough turning a large hollow forged boiler drum at the English Steel Corp., Sheffield

German Coal Output Held Hinging on Food Program

Declaring that there can be no integrated European economy until Germany's 70 million people are "taken off the Allied dole and put to work to support themselves, to pay their reparations and to begin producing the coal, the machinery. . . . . the goods that all the Continent needs," William L. Batt, president, SKF Industries Inc., Philadelphia, recently said that a subsistence-level food program is a necessity to "give the German miner will and strength to mine coal."

Mr. Batt said that the bulk of Europe's industrial power depends on sustained coal production, and that German mines have produced only the merest trickle for almost two years.

France To Cut Train Service To Save Coal

English engineering firm reported making study of modernization and consolidation of French steel industry

PARIS

A DROP in coal production was experienced at the end of December and the output per man-shift also dropped due to extreme cold weather. Imports showed a slight increase, especially from the United States. Delivery of 467,000 tons of American coal was made despite the strike. The shortage of coal continues to be serious, and a general plan has been made to alleviate the situation; this includes a curtailment of daily train services, and the complete suppression of more than 50 trains.

It is reported that John Miles, managing director of H. A. Brassert & Co. Ltd., which firm has been re-organized under the name of J. Miles & Co. Ltd., has been asked by the French iron and steel interests to make an investigation of the French steelworks and has offered a report on the improvements to be made in modernization of these works.

He is said to have given particular attention to a plan of consolidation of the Acieries de Pompey and of Cie. Chatillon-Commentry, at the request of these two groups; negotiations are reported to be well advanced. Pompey has one works at Pompey and one at Diuelouard, and a drawing mill at Lorette in Lorraine. Chatillon-Commentry have works at Neuves-Maisons Champigneulles in the East, at Tobergues in the North, at Montlucon and Commentry in the center of France, and wire mills.

It has been reported that the Montlucon works may be taken over by the state organization that operates the Renault works near Paris. Chatillon-Commentry has agreements with the American Rolling Mill Co.

Copies of Brazilian Mining Code Available in English

Expected to be of interest to American mineral industries, an English translation of the Brazilian Mining Code has been made available by the Bureau of Mines, U. S. Department of the Interior, Dr. R. R. Sayers, bureau director, has announced.

BETTER SURE THAN SORRY

According to olden legend Icarus flew too near the sun, only to spin in when his wings failed to stand the stress at high temperature. Here was an early case of serious trouble due to misplaced confidence in materials.

There are many applications for steel nowadays where creep strength (the ability of steel to keep working when the heat is on) makes a tremendous difference. Molybdenum steels, being noted for their creep strength, are economical preventives of high temperature trouble.

Icarus had no accurate data on materials to guide him. A wealth of tested, practical facts about Molybdenum steels for elevated temperature service is available on request for today's engineers and designers.

MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"
CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

Climax Molybdenum Company
500 Fifth Avenue · New York City

MOLY

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Ford's announcement of price reduction viewed as healthy economic portent and well-timed competitive action. Prices still higher than Chevrolet's on most models. General Motors increases prices on larger models

DETROIT

AS A HEALTHY economic portent and a well-timed competitive action, the Ford price cut of $15 to $50 on all models except Lincoln and Mercury was important news, but actual cash savings for prospective Ford buyers will be trifling. Essentially the cut brings prices down to the Chevrolet level in only one model, the 6-cylinder two-door sedan which is now $2 less than a comparable Chevrolet, other models continuing higher than Chevrolet but below the Plymouth line. Ford, it will be recalled, was given three upward price adjustments by the OPA in 1945, and the current price cut does not entirely wipe out the third of these increases.

No one can argue with the sound reasoning of the carefully worded statement released at the time of the price reductions; it should be accepted and reiterated by other sections of U. S. industry. Thus: "The American economy now stands at a turning point. Mounting costs and rising prices have warranted caution and hesitancy. There is even general fear that this dangerous, unAmerican cycle cannot be corrected without an economic recession. We think this fear can be dispelled by common sense and action. And among free men that becomes an individual responsibility. Ford Motor Co., therefore, proposes to accept its losses since V-J Day as an item of the cost of a great and victorious war. We are closing our books on that phase of our production history. We have decided that now is the time for us to make an investment in the future."

Action Anticipated by Some

The press was hurriedly called to the Rouge plant only a few hours before the announcement was released. Many of those in attendance were expecting just the news they received, although some figured the reduction would be more. Mr. Ford read the prepared statement slowly and deliberately, flanked by his dozen or so top lieutenants in charge of all phases of the business. They appeared to watch closely for reactions from the 40 assembled press representatives. A few routine questions were asked, most of them dealing with the higher wage demands which the UAW-CIO presumably will make on Ford around May 1, or 30 days before the present contract expires. Mr. Ford said it was premature to discuss this matter.

The writer directed a question to E. R. Breech, executive vice president, inquiring whether the company had been able to determine how much recent increases in steel prices would increase material costs per car. Mr. Breech tactfully replied, "Yes," and agreed that the increase would be substantial. Ford is in a little better position than some other automobile manufacturers in this respect, since an estimated 35 per cent of overall steel requirements are produced in Ford mills.

All Ford suppliers received a copy of the statement on price reductions, along with a letter from A. J. Browning, vice president in charge of purchasing, explaining: "It is not our intention to attempt to take this price decrease out of the hides of our suppliers. The purchasing policy of Ford is that suppliers should make a fair and reasonable profit, consistent with individual efficiency. Profits are absolutely necessary if a manufacturer is to be in a strong, healthy position and remain a desirable source of supply. We do hope, however, that the period of strikes and fluctuating production as a result of supply stoppages is behind us, and that steady production and increasing productivity of the workers will favorably affect costs in such a way that prices can be held at reasonable levels. We at Ford appreciate the wonderful cooperation and help that is being given us by our suppliers in improving our quality and reducing our costs by means of suggestions and recommendations, and assisting us in maintaining our production schedules. . . . "

The inference is obvious that the company proposes to exert no undue pressure on suppliers as far as prices are concerned. That day is still in the unpredictable future. In fact, Ford, like most other automobile manufacturers, is making a point of cultivating and coaxing suppliers, even going so far at Christmas time as to send many of them a handsome automobile service light, operated by plugging into the cigar lighter on the dash. Such largesse is unheard of in the annals of Ford Motor Co.

Unorthodox timing of a price reduction has been a characteristic technique of the company over the years. Back in June, 1920, when the postwar going began to get a little rough, Ford cut prices with 150,000 orders on hand and followed up that move with some of the neatest financial maneuvers on record to save the company from bankruptcy. Both suppliers and dealers contributed mightily to this salvation, and Ford's success in running a bank account of $20 million to $87 million in 3½ months was heartening news at the time.

Along the automotive front, the latest Ford price action drew little comment. The UAW, of course, declared the cut did not amount to a hill of beans and would affect in no wise its plan to ask for higher wage rates. General Motors, apparently, was so little disturbed that it announced further price increases on a number of its models, ranging from $17 to $193. No change was made in Chevrolet, probably in view of the competitive situation with Ford.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1946	1941
January	121,934	524,073
February	84,141	509,332
March	140,777	533,878
April	248,318	489,856
May	247,620	545,355
June	216,637	546,278
July	331,000	468,897
August	359,101	164,793
September	342,727	248,751
October	410,466	401,369
November	380,460	373,892
December	381,354°	302,518
Total, 12 mos.	3,264,535°	5,108,992

Estimates for week ended:

	1947	1946
Jan. 4	53,437	13,920
Jan. 11	64,828	23,340
Jan. 18	77,034	28,485
Jan. 25	85,000	29,410

° *Preliminary.*

Few Changes in 1947 Models

One of the more difficult jobs these days falls to the lot of publicity writers assigned the task of conjuring alluring descriptions of 1947 models in which the only change from 1946 may be the elimination of one horizontal bar from a radiator grille. The changes' only purpose can be to obsolete 1946 models by

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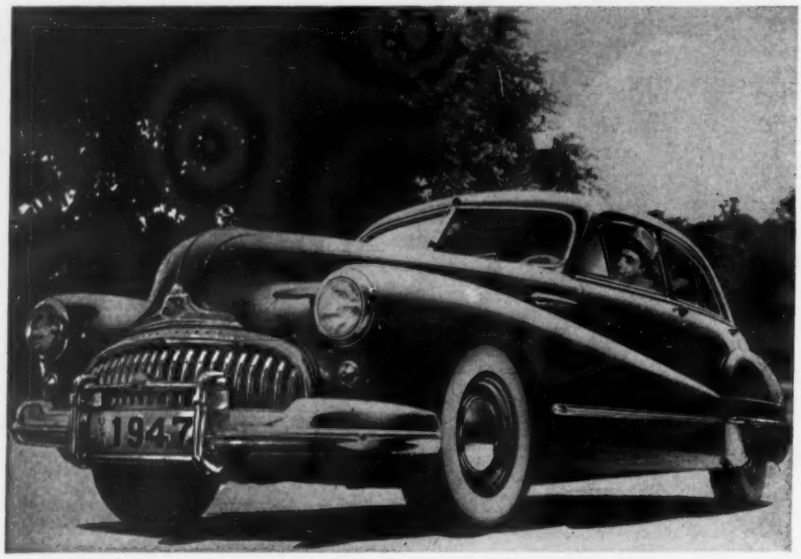


1947 BUICK: Styling changes feature the new 1947 Buick now in production in three series and nine body styles. Output on new models is scheduled at 1100 units daily

effecting a slight revision in appearance, scarcely noticeable by the average eye.

Pontiac, in addition to a new grille, has a redesigned instrument panel cluster plus restyled hub caps and front nameplate. The division hopes to produce 250,000 units this year, against 137,640 last year. Olds has a new plastic hood ornament, new front fender ornament and new trunk lid, as well as revised radiator grille.

Buick sports a much snappier looking radiator grille and incorporates a number of unidentified minor mechanical improvements together with refinements in the body mounting system. Windshield wipers are of a noiseless type, and design of the heating and ventilating system is advanced. Feature of Buick's postwar manufacturing departments is an automatic machine line for precision machining cylinder blocks. The line includes 45 machines, some weighing up to 43 tons, and occupies 27,000 sq ft of floor space. Each machine is a self-contained unit linked to the next operation by a short length of gravity conveyor. Blocks emerge from the progressive machine line with bores having a maximum variation of 0.0005-in for taper and out-of-round.

Understanding Reached

In this department (STEEL, Aug. 12, 1946) comment was made on the immediate reaction of the Ford UAW Local 600 to installation of a chronolog unit for measuring idle time on a crankshaft grinder. The vicious attack made by the union in its weekly newspaper on the installation was cited as an example of an inadequate liaison between management and labor unions. It can now be disclosed that this unjustified "blast" by the union was made in advance of a scheduled meeting between management and union representatives to explain the use of the chronolog. Ultimately such a meeting was held and a complete and candid exposition of the proposed system was given. Discussion by the entire group followed, and, as a result, full understanding and acceptance of the equipment was obtained. However, no such admission ever appeared in the union newspaper. Additional details relating to the functioning and interpretation of measurements made by the National Acme Chronolog appear in this issue on page 77.

Points to Nathan Fallacy

The fallacy of lumping all industry profits together as an index of the general profit position, such as Robert Nathan and other alleged economists are doing in current analyses, was reviewed by Albert Bradley, executive vice president of GM in a recent New York address. He cited a simplified case: In 1936 Company A made $2 million profit. Company B, in the same line of business, lost $1 million. The aggregate profit of the two, therefore, was two minus one or $1 million. Now in 1946, Company A continues to earn $2 million—no increase over 1936. Company B, however, is now in the black too, although it is making no more than its competitor, A. Both, in other words, are now making what was considered a fair profit in 1936—$2 million a year. However, when the aggregate is considered by "economists," what do they find. An outrageous situation—two greedy corporations have jumped their aggregate profits from $1 million in 1936 to $4 million in 1946, an increase of 300 per cent.

Mr. Bradley concluded too few people understand the function of profits. Actually, profits are no luxury, benefiting stockholders alone, rather they are "the mainspring of our economy, the force down underneath the cogs and wheels that really makes the mechanism tick. We hear a lot these days about maintaining the take-home pay of workers. What about the need for maintaining the take-home pay of investors. Out of earnings paid in dividends and reinvested by stockholders and out of earnings retained in the business comes the capital that makes jobs possible. General Motors is now embarked on a $750 million improvement and expansion program. Part of the funds being used represent profits already earned. Part represents capital furnished by investors who hope for future profits."

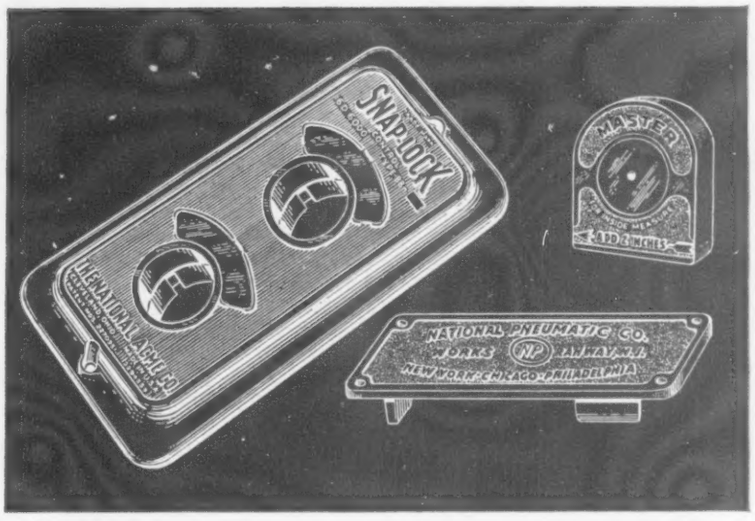
Uses Spun Glass

Use of spun glass soundproofing pads has been adapted to automobiles from wartime use in airplane cabins by Kaiser-Frazer Corp. The material is composed of spun glass and a fiber stock woven into blankets ½-in. thick and cemented to steel roofs and quarter panels with conventional deadener adhesive. Floor panels are covered with ¼-in. flint coating. Spun glass sheets also are used to line the fender ventilation ducts, the material reducing air noise.

Kaiser-Frazer now has 28 large presses installed for producing body stampings, most of them in operation. Front fenders, upper windshield frames, upper cowls, front and rear floor panels and hoods are now being formed at the Willow Run press shop, while roof panels and some other parts may be brought in shortly. It is reported that for a time roof panels were being formed on Kirksite dies in a stretch press, although this was regarded as an expedient until conventional press equipment could be readied.

Rubber Records Established

The rubber industry in 1946 established many all-time records in production and sales. Consumption of natural and synthetic rubber passed 1,000,000 tons and, according to P. W. Litchfield of Goodyear, the performance should be duplicated this year.

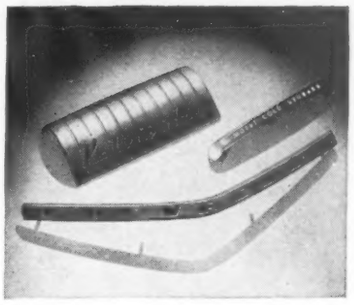


LETTERING IS EASILY OBTAINED IN DIE CASTING

In designing die castings, keep in mind that lettering, numerals, trade marks, diagrams or operating instructions can be cast on the surfaces. But lettering should be so designed and placed as to facilitate die construction and removal of the castings from the die.

Raised, rather than debossed, lettering should be specified, since it is less costly to cut a design *into* a die than to make a raised design *on* the die surface. If, however, the lettering on the casting cannot project above the surface, debossed lettering can usually be achieved by using raised lettering on a removable panel set into the die. In any event, lettering should be done on surfaces parallel—or nearly parallel—to the die parting and should never constitute an undercut which will interfere with removal of the casting from the die.

A variety of lettered zinc alloy die castings—some old, some new—are illustrated here. Those in the drawing above indicate the use of raised letters and numerals on contrasting stippled or corrugated backgrounds. The depressed lettering on the castings in the above photograph permits filling-in with paint to contrast with adjacent surfaces (see finished handle with lettering "MOIST COLD STORAGE"). The castings in the two photographs below illustrate a variety of raised lettering and numerals.



ALLOY SELECTION

Equally important to the design of a die casting is the selection of the proper alloy for its production. The zinc alloys used in the die casting industry conform to specifications of the American Society For Testing Materials and the Society of Automotive Engineers (see table below). When a casting is properly designed and the alloy composition is carefully controlled with respect to every element involved, outstanding mechanical properties and dimensional stability will be assured in zinc alloy die castings.

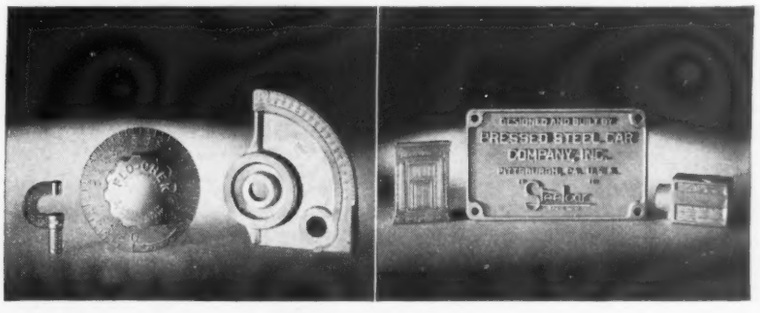
Zamak* and Corresponding A.S.T.M. and S.A.E. Alloys

	A.S.T.M.	S.A.E.
Zamak-3	XXIII	903
Zamak-5	XXV	925

*A trade mark (registered in the U. S. Patent Office) identifying the zinc alloys developed by The New Jersey Zinc Company and used in the die casting industry.

For additional data on die casting design ask us—or your die casting source—for a copy of the booklet "Designing For Die Casting."

Send for your copy



The New Jersey Zinc Company, 160 Front St., New York 7, N. Y.

ZINC FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

Pittsburgh Steel Reactivates Its Products Firm

Pittsburgh Steel Products Co. will act as marketing division for parent company's construction items

PITTSBURGH Steel Co., Pittsburgh, has revived and expanded the Pittsburgh Steel Products Co., a wholly owned subsidiary which has been inactive, Joseph H. Carter, president, announced last week.

The subsidiary will act as the marketing division for the parent company's line of construction products, including Steeltex concrete reinforcement fabric and highway guards, as well as new lines of products.

Revival of the subsidiary is in line with a general trend on the part of tonnage producers to manufacture and market a proportion of fully fabricated products from their own raw materials and semifinished materials.

MACHINES BY AIR FREIGHT: To meet a heavy demand for home workshop tools, Canedy-Otto Mfg. Co., Chicago Heights, Ill., shipped a 7000-lb load of drill presses to a New York distributor. Company is studying the use of air freight to expedite delivery of industrial tools to its customers

LeTourneau Export Division To Locate In New York City

In a step to reorganize its export sales department, R. G. LeTourneau Inc., Peoria, Ill., maker of earthmoving, construction and haulage equipment, has elevated the section to division status and will shortly move it to New York City. While the export department was formerly responsible solely for sales, the newly created division will conduct all export functions, including sales, service, credit, collections, parts, installations, market research and field engineering. Paul E. Fulford has been named manager of the division.

Steel Fabricator Plans Large West Coast Plant

Expansion plans in California of Pittsburgh-Des Moines Steel Co., Pittsburgh, have crystallized with announcement that construction of the first $500,000 unit of its new western plant at Mountain View, Calif., will begin soon. The steel fabricating company plans eventually to build two more units of similar size.

The company, which produces steel plate specialties, has been active on the West Coast for nearly 40 years, and at present is installing two supersonic wind tunnels at Moffett Field, the Navy's experimental air station near Mountain View. Steel suspension bridges for the natural gas pipeline under construction between Texas and California are also being built by the company.

One product of the projected plant will be patented steel grandstands for racetracks, gymnasiums and stadiums.

Engineering Service Division Set Up by Hart Steel Corp.

The formation of Transportation Specialties as an engineering service division of Hart Pressed Steel Corp., Elkhart, Ind., has been announced. The new division is a move intended to provide engineering service in designing and manufacturing parts for truck bodies, automobile bodies, truck cab bodies, bus bodies and various types of special transportation equipment. Transportation Specialties is under the engineering direction of John C. Cummings whose 25 years' experience includes service with Studebaker Corp., Highway Trailer Co., Lufkin Trailer Co. and Hays Body Corp.

Brown Instrument Co. Adds 38 Men to Branch Staffs

Appointment of 38 new sales and service engineers to 23 branches throughout the United States and Canada has been announced by Brown Instrument Co., Philadelphia, a division of Minneapolis-Honeywell Regulator Co. All the newly assigned personnel have completed a course in industrial instrumentation at the Brown Instrument School, which has been established for 11 years.

Snyder Awards Service Pins; Cites Exceptional Records

At an annual ceremony in the company's new plant in Detroit, Clarence Snyder, president of Snyder Tool & Engineering Co., builder of special-purpose machines, presented company service pins to 44 employees. Leading these were two with 20 years of service. Mr. Snyder praised the service record of the group and revealed that 10 per cent of 220 employees had over 10 years' service and 53 per cent had more than five years.

Pilgrim Drawn Steel Co. Plans $250,000 Expansion

Pilgrim Drawn Steel Co., Plymouth, Mich., producer of cold-drawn bars and shapes, has announced plans for a $250,000 expansion, which will include erection of an 80 x 230-ft building to accommodate modern pickling equipment for both bars and coils and to provide storage space for an additional 6000 to 7000 tons of bars.

The building, to be served by a 10-ton crane, will be of steel construction and will adjoin the present plant, which consists of two wings, one 80 x 200 ft and the other, 120 x 180 ft.

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Pullman-Standard Car Mfg. Co., Chicago, has delivered the nation's first post-war-built sleeping car equipment to Great Northern Railway. This is part of an order for 25 sleepers.

—o—

Air Reduction Sales Co., New York, has appointed Garden State Welding Supply Co., Jersey City, N. J., a dealer in its line of gases, electrodes and welding equipment.

—o—

William A. Wadleigh Inc., Seattle, specializing in gray iron castings, has changed firm name to Northwest Foundry Inc.

—o—

Minneapolis-Honeywell Regulator Co., Minneapolis, has scheduled a sales meeting for the first week in February at Minneapolis. With over 300 members of the sales staff attending, this will be the largest convention in the 61-year history of the company.

—o—

Dow Chemical Co., Midland, Mich., has acquired the Dow-Velasco plants at Velasco, Tex., from WAA. Property includes a magnesium plant, synthetic rubber plant and a 725-acre land tract northwest of Velasco.

—o—

F. C. Russell Co., Cleveland, manufacturer of screen, storm sash and metal awnings, has purchased Cincinnati Mfg. Co. and Cincinnati Fly Screen Co., both of Cincinnati. Included in the sale was a four-story plant which now gives the Russell company five in Ohio. Purchase price of the two firms was around $200,000.

—o—

Babcock & Wilcox Co., New York, has acquired a 1-story building on a 20-acre site in Lexington, O., from Buffalo Weaving & Belting Co. The plant, which contains 45,000 sq ft of floor space, will be used as a center for all research activities.

—o—

Manufacturers' Machine Shop Inc., Cleveland, maker of tools and dies, has bought from the RFC for $117,500 the plant at 875 E. 70th St. heretofore leased from the government. The property includes a two-story building with about 30,000 sq ft of floor space.

—o—

Ryan Aeronautical Co., San Diego, Calif., announces that a new all-jet fighter plane has been developed for the U. S. Navy. Probably in the 500-mile-an-hour class, the plane is powered by a gas turbine engine turning a propeller, the first Navy combat plane of this type.

—o—

Lamp Department, Cleveland, General Electric Co., has acquired International Cellucotton Products Co.'s plant, Memphis, Tenn. Occupying about 145,000 sq ft of space on two floors, the factory will be used for manufacture of automotive and Christmas tree lights.

—o—

Phenoglaze Sales Corp., New York, announces that phenoglaze, a phenol-formaldehyde protective coating manufactured in England for use on all types of wood and metal products, is now available.

—o—

Tube Methods Inc., Bridgeport, Pa., and the United Auto Workers-CIO recently signed a contract, representing the 35 workers at the plant, which was negotiated after only a day and a half.

—o—

Winchester Repeating Arms Co., New Haven, Conn., will resume manufacture of trap and skeet shot shell loads and .22 caliber short cartridges early this year.

—o—

Congress Die Casting Division, Congress Tool & Die Co., Detroit, announces it is in production on 11-inch and 16-inch pulleys, which gives this manufacturer a complete line from 1½-inch to 16-inch diameters.

—o—

Douglas Aircraft Co. Inc., Santa Monica, Calif., is establishing a European division at Haren Airdrome, Brussels, Belgium. Heading the venture is M. E. Oliveau, formerly administrative assistant to A. E. Raymond, Douglas vice president in charge of engineering.

—o—

Chicago Association of Commerce has changed its name to Chicago Association of Commerce and Industry.

—o—

Metal-Mold Magnesium Corp., Cedarburg, Wis., has purchased for $50,000 the government-owned magnesium casting plant it operated during the war.

—o—

Turchan Follower Machine Co., Detroit, has been reorganized and is now under sole ownership of Manuel Turchan. The firm remains at its old address and continues to make hydraulic duplicating attachments for machine tools.

—o—

Electric Products Co., Cleveland, has named Udylite Corp., Detroit, a distributor for its electrolytic motor generators.

—o—

Universal Power Corp., Cleveland, has been newly incorporated as a result of the merger of Universal Welder Corp. and Universal Power Corp., both of Cleveland. The company will expand its line of resistance welding equipment.

—o—

Wilder Products Co., Niles, O., newly formed for the manufacture of sheet metal goods, has purchased the buildings and land of the Safety Grinding Wheel & Machine Co. which is moving its facilities to Dayton, O. The new company will occupy only part of the property, and the balance, consisting of about 70,000 sq ft of floor space, will be offered for sale or rental.

—o—

Resistance Welder Manufacturers' Association, Cleveland, announces that $2000 in cash prizes will be awarded in 1947 for outstanding papers dealing with resistance welding subjects.

—o—

Harold Lasker Co. Inc., New York, has been newly formed for construction of fabricated plate, structural steel and special industrial equipment. Harold H. C. Lasker, principal in the new firm, has been and also remains associated with Lasker Engineering Co., which will continue in a professional engineering capacity and will act as sales representative for Harold Lasker Co. Inc.

—o—

Westinghouse Electric Corp., Pittsburgh, and **Tropical Radio Service Corp.,** Boston, subsidiary of United Fruit Co., have announced a sales and servicing agreement in which Westinghouse will manufacture marine radar equipment with Tropical as a major channel for installing, licensing, servicing and selling the units.

—o—

North American Phillips Co. Inc., New York, has appointed Moss X-ray & Equipment Co., Chicago, as dealer for its medical and industrial x-ray research equipment.

—o—

National Twist Drill & Tool Co. has moved its general offices and manufacturing facilities to its new plant in Rochester, Mich. An office is still maintained in Detroit at the old address, East Grand Blvd. at Brush St.

—o—

Lincoln Electric Co., Cleveland, announces appointment of Wallner Welding Supply Co. as its dealer in Duluth.

Coast Labor Markets Now Tightening

Employers becoming more selective, with workers showing less fussiness over wages, hours, etc., in accepting jobs

SAN FRANCISCO

MARKETS for labor are tightening on the West Coast. Employers are becoming more exacting in requiring that job applicants have specific skills. Workers, on the other hand, are showing a greater willingness to accept work of any kind without displaying fussiness over wages, hours and other working conditions.

A statistical survey of this changing trend is showing in the San Francisco Bay area. As the new year started, more than 51,000 persons were on file for jobs at California State Employment Service offices in this region. As against this demand, there were less than 7500 job openings listed.

At the middle of last year listed job applicants numbered approximately 62,000 and at that time there were about 13,500 openings.

Employers report jobs remain open at present for many skilled workers, who have necessary qualifications and experience, but that there is a "tremendous" surplus of unskilled help in this area.

Similar Conditions Elsewhere

Very similar conditions exist in other major cities on the West Coast. Frequently, personnel managers of large industrial plants report they are not interested in hiring young, untrained labor, but there are openings available for experienced workers. Women workers in manufacturing operations also seldom are wanted these days, and women clerical workers and office employees are finding it more difficult to get work of that nature without a more generalized knowledge.

One factor which is complicating labor problems for many industries is the fact that the war disrupted apprentice training programs. Young men were not available during the war years to learn trades, and now it often is difficult to entice young men into heavy dirty work. As a result some enterprises have had to depend on older workers whose ranks are being thinned by age. This is true, for example, of the foundry industry. In the San Francisco area skilled foundrymen are in demand, especially coremakers and molders.

Many war workers who found it easy to hold jobs in shipyards now are learning it is more difficult to qualify for positions in civilian trades. For example, journeymen ratings handed out to shipyard workers are not sufficiently high to comply with the standards of the peacetime construction industry. The result is that such workers have been demoted to semi-skilled classes, of which there is a surplus at present.

Students of employment and population trends believe that these conditions reflect a transition period and that employment will tend to stabilize as production increases. During the war California and the West Coast in general acquired many new industrial plants, and plans for many other new installations have been blueprinted. However, production in many plants still is below their potential because of material shortages, and other shortages are delaying construction of the new plants.

It is believed that when production begins to rise to its potential, California will be able to support a far larger population than now, even though it has experienced a large gain in the last few years.

In connection with this viewpoint is the recent report of the State Reconstruction & Reemployment Commission which estimates that California's population will rise to about 10 million persons by 1950 and to between 11,100,000 and 13,500,000 by 1960. At present, the state's population is estimated at 9,350,000, a gain of about 2,450,000 in the last six years. To this number are added an estimated 250,000 military personnel, making the number of people now living in California approximately 9,600,000.

PREDICTS MORE JOBS: Further mechanization will create more jobs in industry, A. M. Sargent, right, president of the American Society of Tool Engineers, declared in a visit to the West Coast. Shown with Mr. Sargent is Anton Peck, chairman of the Los Angeles chapter of the society.

West Coast Buyers Told of Factors Behind Steel Lack

The entire nation is affected by the current heavy demand for steel, F. B. DeLong, vice president and general manager of sales, Columbia Steel Co., U. S.

Steel Corp. subsidiary, said speaking at the conference of the Pacific Intermountain Purchasing Agents at the St. Francis Hotel, San Francisco.

"There is no one cause, but rather a series of causes for the present steel supply situation," DeLong told the group. "We must recognize in the first place that the tight situation in steel is not confined to the West Coast. It is of a national nature.

"The reasons for the present inadequacy of steel supply are these: Demands have reached a record high for a peacetime period. Manufacturers of products of steel are faced with the compelling necessity of trying to supply demands which accumulated during the war years and now stand at unprecedented levels. This demand for products of steel is by no means greater than the requirements which manufacturers have placed with the steel industry. Our problem is to meet these demands as fully and as promptly as possible, and I am glad to be able to say that we feel we are making substantial headway toward those ends.

Steel Inventories Still Low

"An important contributing factor to the failure thus far of manufacturers to return to a level of production which can be expected to supply demands for steel products with a maximum of speed is the absence or low level of raw material and in-process inventories. Such inventories normally maintained by the mills, factories, jobbers and distributors throughout the country were depleted during the war.

"Such inventories are the raw material pipelines from steel mill to factory, and I am frank to say that it would take a large part of a year's production in many steel products just to fill this pipeline.

"There is still another factor which contributes in a substantial measure to the current problem. In spite of the fact that the national capacity for steel production is substantially greater than before the war, we have not, during the year past, been able to utilize that capacity fully and effectively. One of the reasons for this is the fact that our equipment has had long and hard usage during the war. Normal maintenance and replacement was not possible. Many of you faced that problem in your own plants and know that deferred maintenance cannot be caught up immediately.

"Furthermore, strikes and work stoppages have caused the loss of an enormous tonnage of steel. However, during the periods not impeded by stoppages, production set some real records. In the third quarter of 1946 for instance, the industry produced steel at a rate 55 per cent over the comparable period in 1939."

California Industry Seen Aided By Continued Population Growth

Hundreds of new industries have located in area during past year with investments over $200 million. More than 300 companies reported planning to establish branch or main plants. Freight rate cut to stimulate steel movement

LOS ANGELES

CALIFORNIA economists, in predicting trends two years or so ago, virtually were unanimous that the growth pattern in the state after the war would first show recessions from wartime peaks before resuming its advance. As is well known, growth did not follow this design; it moved in exactly the opposite direction.

California, according to L. M. Giannini, president of the Bank of America, has added to its population since the war, besides retaining the development brought on by the demands in that period of conflict.

These facts have led him to the conclusion that "unfilled wants for industrial plants, business structures and residences, coupled with the highway program, create a backlog of demand that for several years should challenge California's production capacity."

Hundreds of new industries have located in the state in the last year, with total investments well over $200 million. Noting this fact, Mr. Giannini said that based on information obtained in records of the more than 500 branch banks of the Bank of America, more than 300 additional industries are known to be actively engaged in planning branches or main factories in California. Shortages in labor and materials are the sole factors preventing start of construction.

Loans to provide new capital for these expanding industries have totaled nearly three-quarters of a billion dollars from his bank alone, Mr. Giannini disclosed.

Hails Freight Rate Cuts

K. T. Norris, president, Norris Stamping & Mfg. Co., Los Angeles, and chairman of the Steel Committee of the Western States Council, last week hailed reduction of freight rates on steel from Geneva, Utah, to the West Coast by three railroads as "vastly beneficial to western industry."

The reductions from $14 to $9.60 a ton have been announced as "intentions" by the Union Pacific, Western Pacific and Denver & Rio Grande Western. Expectations are that they will become effective about Mar. 1.

"The steel committee has recognized from the start that operation of the Geneva mill, with its beneficial results to western industry, was contingent upon a reduction in the existing freight rate," Mr. Norris said.

"The action of the three railroads in announcing their intention to publish this lower tariff is gratifying to the committee and to all western industrialists."

Belden Mfg. Co., Chicago, has included in its expansion plans a plant in southern California, Whipple Jacobs, president, announced last week. He said he is now engaged in a preliminary survey regarding location of the factory.

Mr. Jacobs said the company will spend about $700,000 in expansions this year, following investment of $800,000 in similar enlargements last year.

Electronics Report Issued By San Francisco Chamber

As part of a campaign to attract new industries to the San Francisco area, the San Francisco Chamber of Commerce has released a 68-page report on the advantages for establishing electronics manufacturing plants here.

The survey is divided into two sections. One discusses the Bay region's electronics industry and the factors which have governed its growth, and the other is a detailed index of electronics manufacturers in the area.

Southwest's Industrial Rise Is Keynote for Engineers

"The Industrial Development of the Southwest" has been announced as the theme for the 1947 spring meeting of the American Society of Mechanical Engineers, to be held Mar. 2-5 at the Mayo Hotel in Tulsa, Okla. Some 20 technical papers and addresses will be given at 12 technical sessions, on power, aviation, management, fuels, industrial instruments and regulators, oil and gas power, education, petroleum and metals engineering.

W. Fred Stewart, engineer with Spartan Aircraft Co., Tulsa, is chairman of the committee on local arrangements. Plant trips to local refineries, laboratories and factories are planned.

Men of Industry

HERBERT H. SNOWDEN

J. C. FARRELL

CHARLES B. LANSING JR.

Herbert H. Snowden has been appointed assistant general superintendent of the rod and wire mill department, Portsmouth Steel Corp., Portsmouth, O. He was former works manager, Seneca Wire & Mfg. Co., Fostoria, O.

—o—

Louis A. Schlueter has joined the staff of the American Coke & Coal Chemicals Institute, which is the new name of American By-Product Coke Institute, Washington.

—o—

Donn Sufton has been named public relations counselor for Borg-Warner Corp., Chicago.

—o—

Jones & Laughlin Steel Corp., Pittsburgh, has made the following appointments in the raw materials department: **W. P. Getty,** assistant general manager; **M. E. Fry,** assistant to the general manager; **E. R. Cooper,** manager of coal mines; **W. E. Hess,** general superintendent of coal mines; **H. K. Griffith,** assistant manager of coal mines. **P. L. Tietjen,** marine manager, Interstate Steamship Co., becomes manager of that company, which is a subsidiary of Jones & Laughlin Steel Corp.

—o—

Frank H. Barnett has been named manager of manufacturing, Home Radio Division, Westinghouse Electric Corp., Sunbury, Pa. **Harry L. Johnson** was named purchasing agent for the corporation's newly created Standard Control Division, Beaver, Pa.

—o—

Terry Hanlon has been appointed district manager of a newly created branch office in Buffalo for Luria Brothers & Co.

—o—

Ray L. Rex has been appointed general superintendent of railroad service, Air Reduction Sales Co., New York.

—o—

W. E. Farrell, president, Easton Car & Construction Co., Easton, Pa., has been elected chairman of the board of directors. He is succeeded as president of the company by his son, **J. C. Farrell,** formerly executive vice president. **R. C. Haggerty** has been elected vice president and treasurer.

—o—

Thomas M. Chalmers, vice president, operations, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., retired Jan. 1 to become operating consultant to the vice president, engineering and operations, United States Steel Corp. of Delaware, Pittsburgh. Mr. Chalmers is succeeded by **Arthur V. Wiebel,** who goes to Birmingham from Pittsburgh where he was assistant to the vice president, engineering and operations, U. S. Steel Corp. of Delaware. It was erroneously reported in STEEL, page 74, Jan. 13 issue, that Mr. Chalmers had been named operating consultant to Mr. Wiebel.

—o—

Paul V. Goodman has been appointed director of purchases, Davey Compressor Co., Kent, O.

—o—

Harry T. Woolson, executive engineer, Chrysler Corp., Detroit, and for over 30 years actively identified with the automobile industry, has retired.

—o—

Harvey T. Gracely has been elected president and general manager, Marion Power Shovel Co., Marion, O., succeeding **M. E. Montrose.**

—o—

R. U. Jackson, Hewitt-Robins Inc., Buffalo, has been promoted to co-ordinator of mine conveyor sales. He previously had been manager of the Charleston, W. Va., office and has been replaced there by **J. W. Wantling.**

—o—

Charles B. Lansing Jr., formerly assistant secretary and assistant treasurer, Ferry Cap & Set Screw Co., Cleveland, has been elected treasurer of the company.

—o—

Bryce Gray, recently retired from the Army Air Forces, has joined the advertising department, Pennsylvania Salt Mfg. Co., Philadelphia.

—o—

C. B. Follett has been named regional sales manager, Farm Equipment Division, Ellinwood Industries, Los Angeles. Other appointments made by the company include: **J. B. Van Der Werff,** chief engineer, Electronics Division; and **A. G. Willauer,** assistant project engineer in production of the firm's new engine.

—o—

W. R. Miller has been appointed assistant manager, metallurgical department, American Steel & Wire Co., Cleveland, a subsidiary of United States Steel Corp.

—o—

A. T. Cowan has been appointed general manager, Morrow Mfg. Co., Wellston, O., which is a subsidiary of McNally Pittsburg Mfg. Corp., Pittsburg, Kans.

—o—

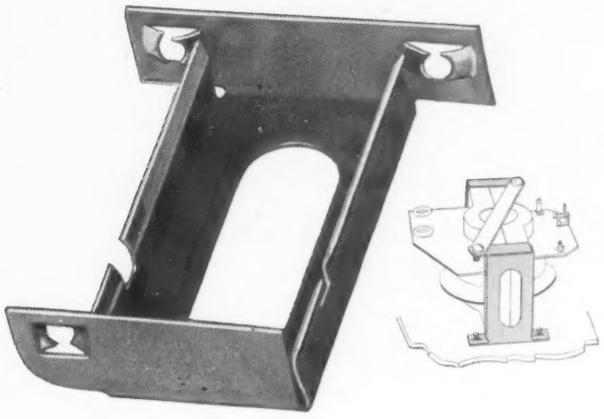
C. Huizing has been named New England representative for Watson-Stillman Co., Roselle, N. J.

—o—

Martin G. Geiger was recently appointed by Davison Chemical Corp., Baltimore, as executive vice president, a newly created position. **Elmer B. Dunkak** was promoted to vice president, **Dr. G. Miller Hebbard** was named a vice president in charge of operations,

This is a SPEED NUT*.....

and



THIS is also a Speed Nut*!

Of course you recognize the Standard SPEED NUT shown above, but just look at the "nightmare" our development engineers dreamed up, to provide multiple fastening and operational functions in a single unit! It is used in the assembly and mounting of television transformers (see sketch) and you can readily understand its advantages over special mounting brackets and individual, hard-to-handle threaded nuts and lock washers.

In addition to the widely-used standard types of SPEED NUTS, hundreds more are *functionally* designed to combine assembly operations, eliminate unnecessary handling of parts, speed-up production and thereby reduce final costs. They are fabricated on specially designed, automatic machines which produce *completely finished* parts at high speeds.

There must be some step in the assembly of your product where, by changing over to SPEED NUTS, your costs could be reduced and your product improved. Why not send us your assembly details, or better still, send in the parts involved. We will be glad to give you a complete fastening analysis . . . at no cost.

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In England: Simmonds Aerocessories, Ltd., London
In France: Aerocessoires Simmonds, S. A., Paris
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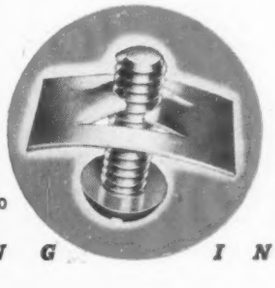

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MORE THAN 4000 SHAPES AND SIZES

* Trade Mark Reg. U. S. Pat. Off.

F A S T E S T T H I N G I N F A S T E N I N G S

and **Dr. Charles E. Waring,** technical assistant.

—o—

William Gillett has been re-elected chairman of the Technical Committee of the steel roof deck industry. Mr. Gillett is manager, Panel Division, Detroit Steel Products Co., Detroit.

—o—

Clyde A. Voris, B. F. Goodrich Co., Akron, O., has been named personnel manager of the company's industrial products plant, Cadillac, Mich.

—o—

William C. House has been elected vice president in charge of manufacturing and engineering, Lyon-Raymond Corp., Greene, N. Y.

—o—

Walter D. Appel has been appointed chief engineer, Willys-Overland Motors Inc., Toledo, O.

—o—

General Motors Corp., Detroit, has announced election of the following as vice presidents: **John F. Gordon,** general manager of Cadillac Motor Division; **Ollie V. Badgley,** general manager, Delco-Remy Division; **Frederick G. Hughes,** general manager of the New Departure Division; and **Edward R. Godfrey,** general manager of the Frigidaire Division. **Paul H. Rutherford** has been appointed special assistant to the vice president of the corporation.

—o—

Julius E. Graf has been appointed chief engineer, Jones & Laughlin Steel Corp., Pittsburgh, and subsidiaries. He has been assistant chief engineer of the corporation for the past 6 years, and succeeds **C. W. Littler,** retired.

—o—

Robert Logie has been appointed treasurer and assistant secretary, National Roll & Foundry Co., Avonmore, Pa. **Francis Nash,** formerly assistant secretary, has been appointed secretary, and **Harry J. Pittenger,** superintendent of the company.

—o—

Harry E. Orr has been appointed general manager of operations of the Bridgeville, Pa., and Niagara Falls, N. Y., plants of the Vanadium Corp. of America, New York.

—o—

Ralph Tuck has been named geologist in charge of the western exploration division, U. S. Smelting, Refining & Mining Co., Boston.

—o—

Marvin Taub has resigned as advertising manager, Radion Receptor Co. Inc., New York.

—o—

Oscar Blohm and **Marshall D. King** have resigned from Hills-McCanna Co., Chicago. They have purchased the former Koepke Foundry Co., Chicago, and have formed a partnership to operate it under the name of Triangle Foundry Co.

—o—

Maurice J. Hoke has been appointed chief engineer, crankshaft and camshaft divisions of the Ohio Crankshaft Co., Cleveland.

—o—

T. R. Kelley has joined the retail division of Buda Co., Harvey, Ill., as field engineer.

—o—

George J. Edellstein has been appointed general purchasing agent for Willys-Overland Motors Inc., Toledo, O. He is succeeded by **Kenneth Mensing** as assistant general purchasing agent.

—o—

William H. Meyer has been appointed metallurgist and sales engineer for the Ohio Industrial Steel Co., Dayton, O.

—o—

John F. Ansink has been appointed Chicago district manager, Cleveland Chain & Mfg. Co., Cleveland. He will be assisted by **Robert Farrington** who has been at the company's Cleveland headquarters.

—o—

William I. Myers and **Frank L. Elmendorf** have been elected directors of Continental Can Company Inc., New York.

—o—

Edwin D. Meade, United States Rubber Co., New York, has been appointed manager of railway sales at the Chicago branch.

—o—

Dr. Courtnay Pitt has been appointed economist of Philco Corp., Philadelphia.

—o—

David L. Parker, foundry superintendent, General Electric Co., Lynn, Mass., has been elected president of the New England Foundrymen's Association.

—o—

J. E. Obernesser, formerly general superintendent of the Milwaukee works, International Harvester Co., has been promoted to works manager of the plant. He succeeds **Menno Felber** who was named works manager at Melrose Park, Ill. **William C. Brice** has been promoted to general superintendent of the Milwaukee works, and **L. E. Emley** has been named to assist him.

—o—

Joseph Savage has been appointed factory manager, Snyder Tool & Engineering Co., Detroit. Promotions within the company are **Howard N. Maynard,** vice president, **George H. Whitehouse,** vice president in charge of sales; and **Kenneth B. Hollidge,** secretary.

—o—

Howard C. Josephson has been appointed general sales manager, Greene, Tweed & Co., North Wales, Pa.

—o—

J. Robert Ferguson Jr. has been ap-

JULIUS E. GRAF

GEORGE J. EDELLSTEIN

JOSEPH SAVAGE

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to Stainless forming problems...

like

Spring-Back? How much spring-back should we allow for in designing dies to dish 12-in. dia., ES 18-8 (Type 302) reflector bowls 2 in. deep, from 10-gauge sheet?

Best Finish for Drawing? What sheet finish is best for deep-drawing, and how can we obtain the highest drawn finish—without after-polishing—on heavy ES 18-8LC (Type 304) hospital ware?

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Deep Spinning? Can ES 18-8LC sheet (Type 304) be spun deeper with a bar or roll spinning tool? What do you recommend as a lubricant and how should it be applied?

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Down-to-earth problems like these are answered every day at Eastern. Your questions about handling Stainless . . . whether on deep drawing, spinning, bending, or any other method of fabrication . . . are invited. Send now for your copy of the all-inclusive catalog, "Eastern Stainless Steel Sheets," for many of the answers. And, if you need further or more specific information, get the answer from any of our 18 offices or distributors.

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ES

PARK SANDERSON

ROBERT J. WILCOX

C. W. LITTLE

pointed assistant chief engineer of the South Chicago plant of Carnegie-Illinois Steel Corp., Pittsburgh, subsidiary of U. S. Steel Corp. He succeeds **H. L. Lietz** who has been appointed chief design engineer.

—o—

Park Sanderson has been appointed manager of the Boston plant, Joseph T. Ryerson & Son Inc., Chicago. For the past 20 years he has been activie in Ryerson service and management operations, and in his new post succeeds **Herbert C. Wills,** who is retiring.

—o—

W. H. Gourlie has been appointed sales and engineering representative for Kelly Reamer Co., Cleveland. He will cover parts of Connecticut and Massachusetts.

—o—

Dr. George C. Kuczynski has been appointed to the research staff of the Sylvania Electric Metallurgical Laboratory at Bayside, N. Y.

—o—

Harold A. Hallstein has been elected executive vice president, the Austin Co., Cleveland. **Laurence E. Cooney,** vice president and general manager of sales, and **Harold A. Anderson,** vice president and eastern district manager, have been elected directors of the company.

—o—

Samuel Insull Jr. has been appointed assistant to the chairman of the board and president of Stewart-Warner Corp., Chicago.

—o—

John C. Banser, attorney, has been appointed general counsel for the Barium Steel Corp., New York.

—o—

Olin H. Horton has been named secretary of the Alabama Mining Institute to succeed **Clyde A. Pippen,** retired.

—o—

Charles K. Donoho, metallurgist, American Cast Iron Pipe Co., Birmingham, has been appointed to the fluidity testing committee of the American Foundrymen's Association.

—o—

Robert J. Wilcox has been appointed acting advertising manager of Carnegie-Illinois Steel Corp., Pittsburgh, U. S. Steel subsidiary, succeeding **G. R. Schreiner,** who was named assistant director of advertising, U. S. Steel Corp. of Delaware (STEEL, p. 64, Jan. 20).

—o—

Acel Garland, supervising engineer, production standards and incentives, Tennessee Coal, Iron & Railroad Co., Fairfield, Ala., has been elected to the board, Association of Iron & Steel Engineers.

—o—

Arthur P. Lathrop has been named assistant plant manager, Leeds, Ala., plant, Universal Atlas Cement Co.

—o—

Universal-Cyclops Steel Corp., Bridgeville, Pa., announces five new men assigned to its sales organization: **William T. Allison,** Hartford; **Walter S. Baker,** Milwaukee; **William G. Beadling,** Cleveland; **Lorenz W. Rinek,** Detroit; and **John L. Stewart,** Chicago.

—o—

Ed O. Reese has been appointed assistant superintendent of the hot strip mill, Campbell plant, Youngstown Sheet & Tube Co. **George C. Brainard Jr.** has been named assistant superintendent of the cold strip mill.

—o—

W. L. Sturtevant, chemical engineer, Manhattan Rubber Division plant, Raybestos-Manhattan Inc., Passaic, N. J., has retired.

—o—

Henry McKee has been appointed market research director, Perfect Circle Co., Hagerstown, Ind.

—o—

Ben H. Anibal, General Motors Corp.'s Pontiac Motor Division, Pontiac, Mich., has been promoted to the newly created position of administrative assistant to the general manager. **George A. Delaney** succeeds Mr. Anibal as chief engineer. **L. W. Ward** has been promoted to general sales manager of the division, succeeding **D. U. Bathrick** who has resigned.

—o—

C. W. Little has been appointed sales manager, Heating Division, Fedders-Quigan Corp., Buffalo. Other Fedders divisions include the Radiator Division in charge of **A. F. Ihde,** Condenser Division in charge of **A. F. DeFino,** Refrigeration and Unit Air Conditioner Divisions in charge of **E. A. Bonneville** and the Water Cooler Division in charge of **H. G. Williams.**

—o—

Five new directors have been elected to the board of the Automotive & Aviation Parts Manufacturers Inc., Detroit. They are: **Wendell W. Anderson,** president, Bundy Tubing Co., Detroit; **Robert H. Daisley,** vice president, Eaton Mfg. Co., Cleveland; **F. C. Greenhill,** president, Acklin Stamping Co., Toledo; **K. J. Ammerman,** assistant to the president, Borg-Warner Corp., Chicago; and **Clarence C. Carlton,** vice president and secretary of Motor Wheel Corp., Lansing, Mich.

—o—

Robert W. Cornell has been elected vice president, Parker Appliance Co., Cleveland. **Otto P. Bereit** has been elected comptroller and **F. A. Herrington,** assistant treasurer of the company.

—o—

Richard W. Shanklin, White Motor Co., Cleveland, has been named sales manager, Wholesale Divsion. He was formerly branch manager at Long Island City, N. Y.

—o—

Edward E. Helm has been elected a director, Reliance Electric & Engineer-

D. B. BAXTER
Appointed district sales manager, Pittsburgh office, Basic Refractories Inc., Cleveland. Noted in STEEL, Jan. 13 issue, p. 72.

G. R. SCHREINER
Appointed assistant director of advertising, United States Steel Corp. of Delaware. Noted in STEEL, Jan. 20 issue, p. 64.

C. H. GODDARD
Appointed general manager, Fluorescent Fixture Division, Sylvania Electric Products Inc., Boston. Noted in STEEL, Jan. 13 issue, p. 74.

ing Co., Cleveland. He succeeds **A. M. MacCutcheon** who retired recently.

—o—

Rex Wilson, the Monarch Machine Tool Co., Sidney, O., has been transferred to the Pittsburgh office. He was formerly in the Detroit office of the company. **N. L. Dilworth,** who has been in the home office in Sidney, will become a field sales engineer, with headquarters in Toledo, O.

—o—

John T. Swift, United States Steel Supply Co., Chicago, subsidiary of U. S. Steel Corp., has been appointed assistant manager of the company's Twin City district plant. He has been associated with the Twin City plant since 1929.

—o—

Dan J. Forrestal Jr. has been appointed assistant to the director of industrial and public relations, Monsanto Chemical Co., St. Louis.

—o—

The Allegheny Ludlum Steel Corp., Pittsburgh, has announced appointment of **Dr. Laurence C. Hicks** as assistant director of research. He has been with the corporation since 1933 and has been associate director of research in charge of magnetic steel and allied products. He is succeeded in that position by **John H. Crede,** who served in the research laboratory at Brackenridge, Pa. **Claude M. Sheridan** was appointed associate director of research in charge of stainless steel and allied products. **William J. Baldwin** has been appointed chief plant metallurgist at the Watervliet, N. Y., plant, succeeding **Ralph P. DeVries,** who recently retired.

—o—

S. B. Williams has been appointed manager of customer relations for the Lighting Division, Sylvania Electric Products Inc., Boston. For the past eight years he has been editor of *Electrical World.*

—o—

Robert B. Mears has been appointed research laboratory manager, Research and Development Division, Carnegie-Illinois Steel Corp., Pittsburgh, U. S. Steel subsidiary. He succeeds **E. S. Taylerson** who recently became supervisor of engineering research for the company.

—o—

Paul H. Dow has been appointed sales promotion manager, Bryant Heater Co., Cleveland. He was formerly with the Airtemp Division, Dayton, O., Chrysler Corp.

—o—

Walter S. Smith, chief production manager, the Butler Mfg. Co., Kansas City, Mo., has been elected a director of the company. **Arvid A. Schoning,** manager of the company's Galesburg Division, also has been named to the board. **Victor Norquist,** consulting engineer, has been elected a vice president.

—o—

Dr. Igor N. Zavarine has been appointed to the metallurgical research staff of Sylvania Electric Products Inc., New York. Dr. Zavarine was professor of physical metallurgy at Massachusetts Institute of Technology from 1930 to 1940.

OBITUARIES . . .

Earl T. Bennington, Louden Co., Fairfield, Iowa, died recently. He had been with the Cleveland Crane & Engineering Co., Cleveland, for 20 years prior to joining Louden in 1941.

—o—

Lewis Ladd Brastow, 72, first sales manager, Trumbull Electric Mfg. Co., Plainville, Conn., died at his home Jan. 9.

—o—

A. G. Overton, superintendent of the Coke Oven Division, Alabama By-Products Corp., Birmingham, died Jan. 11.

—o—

John R. Cooney, 83, retired vice president, Igoe Bros., New York, died Jan. 14 at his home in Maplewood, N. J.

—o—

Evert S. Fink, 73, founder and president, Standard Dials Corp., New York, died Jan. 14.

—o—

John P. Neff, 72, who retired a year ago as vice president in charge of engineering of American Arch Co., New York, died Jan. 17.

—o—

John Monteith, 80, president, Sterling Spring Co., Cleveland, until his retirement in 1935, died Jan. 13.

—o—

Maurice E. Lyons, 77, president, J. H. Day Co., Cincinnati, died at his home in that city recently. He had been with the company nearly 50 years.

—o—

William E. Hartman, 72, Wilputte Coke Oven Corp., New York, died Jan. 13.

—o—

Ralph E. Rowalt, 74, former vice president, Trailmobile Co., Cincinnati, died at his home Jan. 11.

—o—

Millard F. Shelt, 67, died at his home in Cincinnati, Jan. 12. Before his retirement he was owner of the Ohio Corrugated Culvert Co., Middletown, O., and the Shelt Co., New York.

Furnace Brazing steel

By ALLEN T. COLE
Aer-a-sol Div.
Bridgeport Brass Co.
Bridgeport, Conn.
and
H. M. WEBBER
Industrial Heating Div.
General Electric Co.
Schenectady, N. Y.

Fig. 1 — Sectional view of bomb as it comes from the copper brazing furnace

Fig. 2 — Loading station on gravity conveyor. Operators preplace midriff copper wire brazing rings on containers and load assemblies into the trays

Fig. 3—Longitudinal section of container in horizontal position. Lower half shows joints to be brazed with brazing metal in position. Upper half shows assembly as it comes from the brazing furnace with copper iron alloys throughout all joints

Entire plant layout for fabricating 10,000 containers per 8-hour day is planned around two roller hearth copper brazing furnaces. Principle of straight line flow is maintained by belt and roller conveyors through assembly, bonding, testing and inspecting processes

insecticide bombs

MANUFACTURE of the Aer-a-sol insecticide bomb, assembly, bonding and testing involve some interesting techniques of which bonding is the most vital process. Consisting essentially of a steel container filled with liquid insecticide under pressure, the bomb made by Bridgeport Brass Co., Bridgeport, Conn., is electric furnace brazed employing inexpensive copper as the brazing metal, and no flux.

This eliminates all cleaning operations, because the assemblies come from the furnace clean and bright. There are no oxides or foreign materials to be removed. The corrosion and moisture hazard from the formerly necessary internal cleaning has, of course, also been eliminated. The bonds are uniformly strong and tight, and test almost 100 per cent free from leaks. Another very important advantage is that all four of the joints in each assembly are bonded at once in a single trip through the furnace.

In the furnace-brazing process, the assemblies are put together with preplaced brazing metal near the joints to be brazed. As the containers pass through the heating chamber of the electric furnace, a reducing atmosphere frees the metal from any oxides present, prevents the steel from oxidizing, and thus prepares the surfaces of the parts to be wetted by the molten copper. Then, when the brazing metal melts, it creeps on the surfaces of the parts and is drawn into the joints by capillary attraction and forms alloys with the steel.

Upon transfer of the work to the adjoining controlled atmosphere cooling chamber, the solidifying alloys develop great strength, and the assemblies cool down to a temperature at which it is safe for them to come in contact with the outside air without danger of discoloration

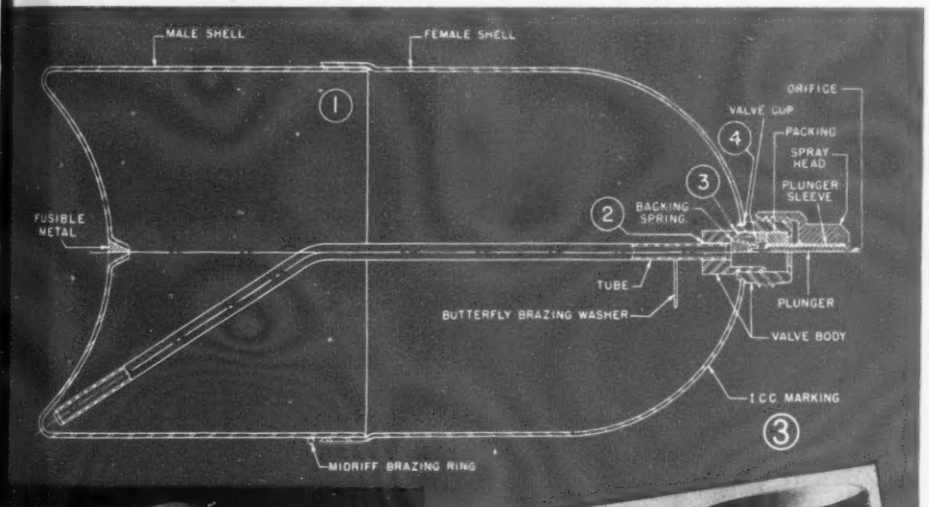
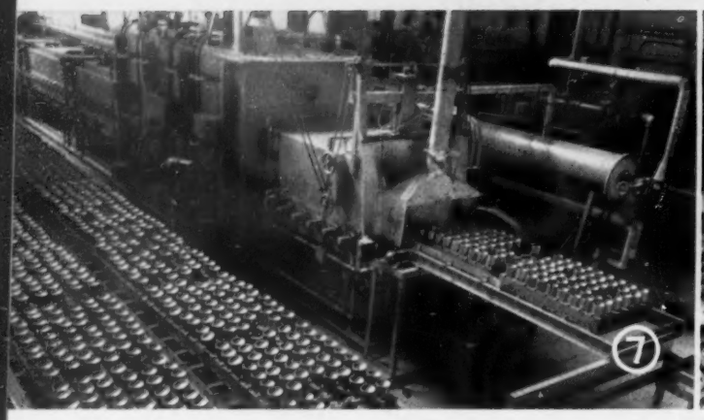
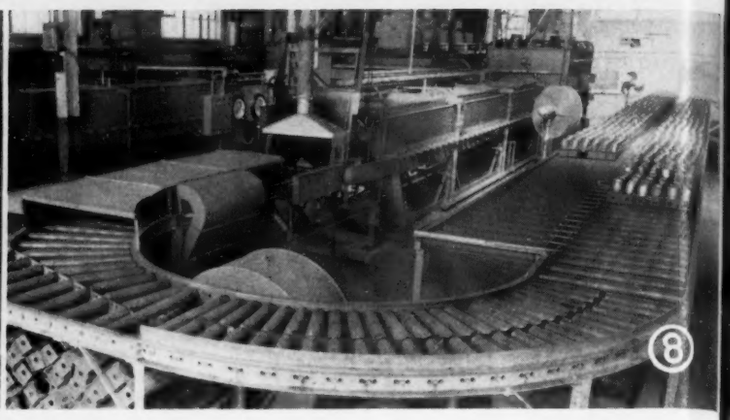


Fig. 4—Opening valve of an Aer-a-sol bomb releases insecticide-laden Freon with force

Fig. 5 — Assembly of valve body, copper butterfly brazing washer and tube are shown at left. Copper wire midriff brazing ring snapped around the male shell near the joint completes preparation for furnace brazing

Fig. 6—Two screw machine parts, left are pressed together to form valve body, center, leaving an internal recess for holding synthetic rubber packing. Butterfly copper washer to provide brazing metal for three joints is placed over end of piece of Bundyweld tubing and tubing is pressed into the valve body





due to oxidation. In this manner, the containers are delivered from the furnace with strong, tight joints, and clean, bright surfaces.

The Container: In the lower half of the sketch, Fig. 3, the brazing metal is preplaced at the joints. In the upper half, the assembly is shown after brazing, with the copper-iron alloy throughout the joints and with the valve assembly and the safety fuse in place. Fig. 1 illustrates a section after brazing; it is being held in the same upright position as that in which it travels through the furnace.

The four joints which are furnace-brazed, numbered in Fig. 3 and tabulated below, are made between the following parts: 1. Female shell to the male shell; 2. siphon tube to the lower half of the valve body; 3. lower half of valve body to upper half of valve body; 4. valve body to the female shell.

The male and female shells for all containers are made of SAE-1010, No. 5 soft, deep-drawing, electric or open-hearth steel. The 15-oz container is made of 0.043-0.049-in. steel, purchased in coils, cleaned and dry soaped. The male shell is blanked and cupped in a double-action press, drawn and clipped, washed, dried, inspected, skimmed, and beveled to provide an entrance angle for assembly, and to remove clipping burrs. Its bottom is then formed and a receptacle is formed and blanked to hold fusible metal.

The female shell is similarly made. It is blanked and cupped, reduced, flared, and stab-pierced. The skirt is drawn and clipped. Then the shell is washed, dried, and inspected. Its bottom is formed and blanked, the ICC specification number and symbol of ownership are embossed, and it is then skimmed and beveled to remove clipping burrs. The latter provides an entrance angle for assembly of the male and female shells, and also forms a reservoir for the molten copper.

The valve body, Fig. 6, is composed of two screw-machine parts made of AISI B-1113 magnetic-tested steel rod. The male section is straight knurled to provide a tight but inexpensive brazing fit with the female section, and it is equipped with grooves which serve as reservoirs to capture any excess copper during brazing.

The siphon tube is made from 1/8-in. diameter Bundyweld copper-brazed steel tubing, cut to 5-11/16-in. length. It is struck about 1/4-in. from one end to form ears, which lock a piece of copper brazing metal in place and prevent its being dislodged during handling and subsequent operations.

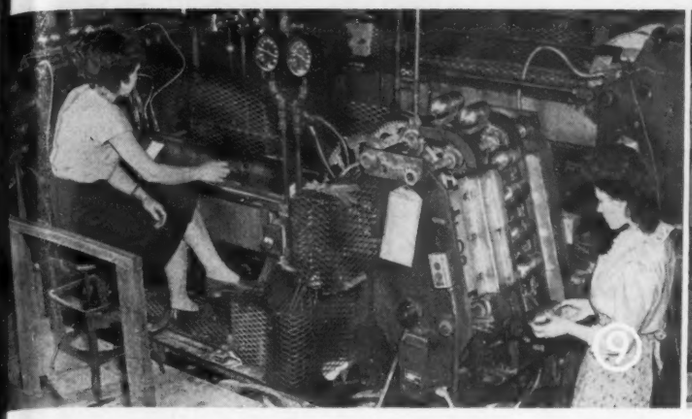
All small integral parts are degreased by vapor degreasing equipment preparatory to assembling, so as to remove cutting and rustproofing oil. The male and female shells are cleaned in a hot caustic solution, and rinsed preparatory to assembling, to remove drawing soap and any other foreign material detrimental to the brazing process.

Brazing Metal: The midriff joint in the assembly, where the two shells come together, is provided with a copper wire ring shown at the bottom of Fig. 5. This ring is made on a spring-winding machine located close to the assembly station to minimize handling and possible distortion—a relatively important point inasmuch as the ring must closely hug the container to assure its entering the joint as it melts. The ring is made of No. 19 Brown and Sharpe gage, hard, commercially pure copper wire. It is formed and knurled by a pair of feed rolls on the spring-winding machine to provide a semicircular cross-section, and to work-harden the copper as much as possible to make it springy.

The three joints at the bottom of the assembly are supplied with brazing metal from a single piece of copper foil, punched in butterfly shape, as shown in Figs. 5 and 6. The washer is blanked from commercially pure sheet copper, 0.010-in. thick. The copper immediately surrounding the tube enters the joint, No. 2 in Fig. 3, between the tube and valve body, and that overhanging the valve body runs down into the joint (3) between the two parts of the valve body, and (4) between one part of the valve body and the female shell. This is a simple, effective, and inexpensive method of providing brazing metal to the lower portion of the assembly.

Assembly Line: Principle of straight-line flow is used in fabricating the container. Work from various operations is carried on belt conveyors and fed into hoppers for all press operations. Assembled containers ready for furnace-brazing arrive alongside a roller conveyor running parallel to the furnaces, at which station the midriff brazing rings are applied to the containers, and the containers are loaded into the brazing trays. The trays are then manually transferred on the roller conveyor to a cross transfer table which carries them in front of either furnace, so that they can be rolled off onto the furnace charging table.

Trays are automatically charged into the furnace. They travel slowly through it on a motorized roller conveyor, automatically discharged, make a U-turn, and travel along the return conveyor to an unloading station. Here the brazed containers are inspected (*Please turn to Page* 110)



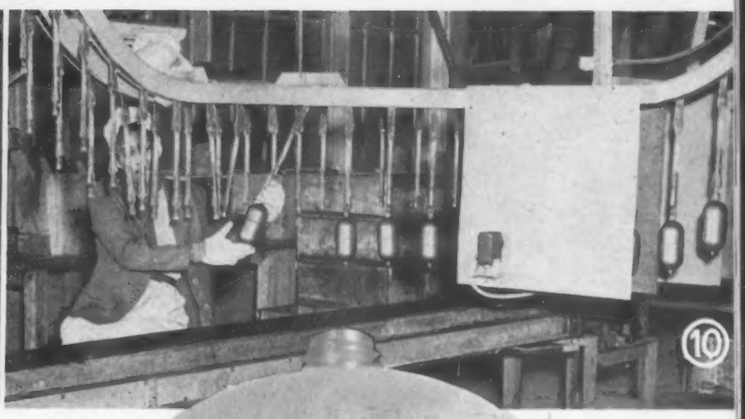


Fig. 7—Trayloads of containers ready to be furnace brazed are carried from return conveyor, extreme left, by means of manually-operated transfer table to gravity end table in front of either of the two General Electric roller hearth electric brazing furnaces

Fig. 8—Trays are discharged automatically from protective atmosphere cooling chambers of both furnaces, given additional air-blast cooling and then make U-turn onto return gravity conveyor

Fig. 9—Bombs are air-pressure tested in this automatic machine, at 200 psi for the 15-oz container or 400 psi for the 16-oz

Fig. 10—Charged bombs are lacquered on a conveyor, then taken off at this station for inspection

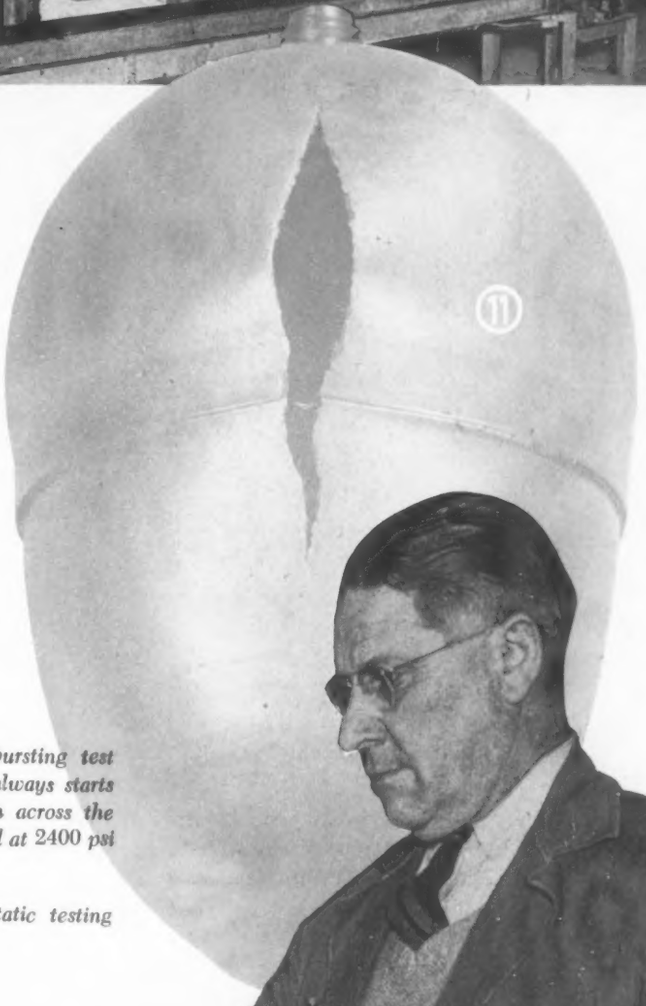


Fig. 11—Closeup of typical failure after bursting test was applied to a 16-oz container. Rupture always starts in the single layer of steel and tears down across the brazed, overlapping joint. This bomb ruptured at 2400 psi

Fig. 12—ICC specifications require hydrostatic testing in this equipment

BALL BUSHINGS

MINIMIZE FRICTION IN LINEAR MOTION

By LLOYD H. LEONARD
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Designed for round shafts new unit provides advantages of low rolling friction with unlimited oscillating linear travel. Basic operating principle involves use of a series of balls rolling in continuous oblong tracks which supply necessary recirculation

IT is significant that while plain bearings sufficed for the wheel axles of carts and wagons for many centuries, the demand for reduction of friction, as well as for decreased wear, finally resulted in the development of ball and roller bearings.

Advent of the bicycle, about 80 years ago, especially focused attention on the importance of minimizing axle friction, and thereby contributed materially to the establishment of the antifriction bearing industry. The substantial power saving and reduced wear of ball and roller bearings for all kinds of rotating shaft applications gradually became widely recognized with the inevitable result that manufacture of ball and roller bearings grew into the present sizable industry.

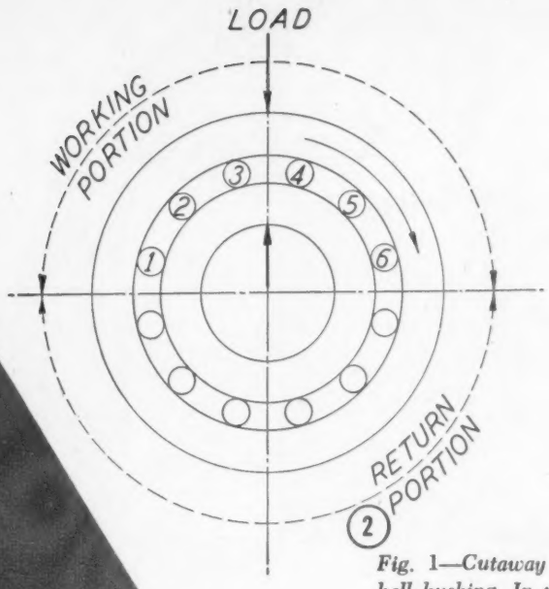
For many decades, antifriction bearing development was devoted almost exclusively to rotating shaft requirements. Notwithstanding the thousands of applications in all kinds of machinery involving oscillating linear motion, not much progress was made until recently toward development of antifriction bearings exclusively for linear travel.

In applications involving linear travel and requiring low friction, it has been a common practice to provide mountings involving the use of a series of rollers or balls running on specially cut tracks or rods, a number of recent applications being on tables and slides of precision machine tools. Generally speaking, linear travel has remained in the "sliding surface" class, apparently shunted aside during the intensified perfection of ball and roller bearings for rotation.

As surely as ball and roller bearings were finally developed to minimize axle friction and reduce wear, a corresponding advance in bearing practice came to pass in the field of linear travel, especially long stroke travel. A new type antifriction bearing designed exclusively for linear motion was developed during the past few years. The new bearing is called the "ball bushing" and may be built for round or square shafts or for semiround, flat or V-shaped ways. In any case, it provides the advantages of low rolling friction with unlimited travel for linear motions.

There are a number of advantages to be gained by use of ball bushings for linear motion. One of the most important, as in the case of ball and roller bearings, is the substantially lower friction, both for starting and running. Lower friction means less required power, frequently permitting the use of a smaller motor and a general scaling down of gear and shaft sizes with a resulting all-around improvement in compactness and reduced weight. Even when applied to an existing design, these new ball bushings can be effective in reducing load on driving mechanisms with consequent savings in operating expense.

As a result of their very low friction, ball bushings have virtually negligible wear, maintaining almost precisely the same degree of fit as was initially the condition at assembly. This feature is characteristic of the rolling contact principle and duplicates—for linear travel—the absence of wear characteristic of ball and roller bearings on rotating shafts.



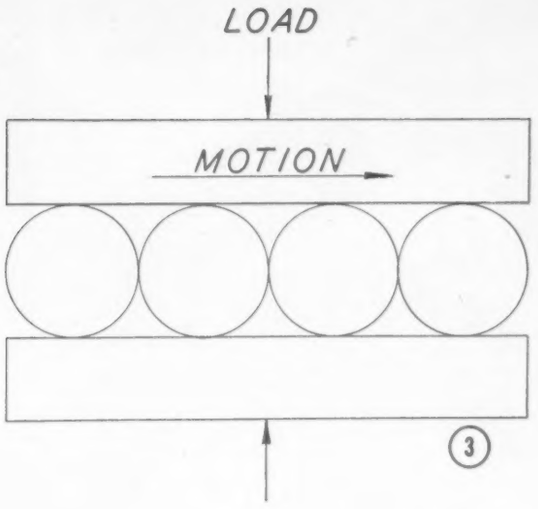


Fig. 1—Cutaway perspective view of a typical 4-circuit, round shaft standard ball bushing. In upper straight portion of the partially exposed ball circuit, balls contact both shaft and ground inner diameter of the sleeve, thereby carrying antifriction load

Fig. 2—Bearing track may be considered to be made up of a working portion including the loaded balls, 1 to 6 inclusive, and a return portion containing the remainder of the balls

Fig. 3—Ball bushing operates on principle of rolling friction involving basically the use of a series of balls or rollers guided between two surfaces in such a way as to support a substantial load and yet permit a nearly frictionless relative motion of the surfaces, as indicated by the arrow

Initial fits can be made very close, even to the extent of providing slight preload if necessary. Thus for special applications where precise alignment of an oscillating shaft, together with an absolute minimum of friction are "musts," as frequently is the case in instrument design, ball bushings are well suited.

Standard ball bushings now available have small outside diameters. Actually they require housing bores only little, if any, larger than the average plain bushing. The resulting assembly therefore will be nearly as compact as for that of plain bushing design. It is now possible to use no more than two compact ball bushings to support a shaft for linear motion. These ball bushings may be easily and neatly mounted in a single accurately bored hole.

As will be revealed in a description of their operating principles, ball bushings are so designed as to provide antifriction motion for any desired length of travel between the bushing and the shaft. The designer is free of restrictions in this category.

A secondary advantage inherent in the bushing design is freedom from lubrication problems. It is well known that the rolling principle minimizes amount of lubricant required. Ball and roller bearings regularly operate for long periods and at high speeds with only a small amount of initially sealed-in lubricant.

Experience with ball bushings has demonstrated a similar characteristic. In fact, ball bushings have been operated at high oscillation speeds for long periods, depending for lubrication only on a few drops of oil supplied initially, with none added thereafter. It should rarely, if ever, be necessary to add further lubricant to a ball bushing after initial installation.

Freedom from the necessity of constantly renewed lubrication not only reduces costs but also eliminates the need of making oftentimes costly and space-consuming provision for retrieving excess lubricant. Always desirable from the standpoint of cleanliness, elimination of dripping oil from shafts and other parts becomes a highly important consideration in certain installations. Thus, for example, in the case of textile machinery and printing presses, it is vitally important to avoid any possibility of lubricant coming into contact with the delicate fabrics or printing paper that pass through the machines. If combined with ball and roller bearings, ball bushings now make possible antifriction mountings for both rotation and unlimited linear motion with completely sealed-in lubrication throughout.

The introduction of the ball bushing is inspiring serious consideration of some basic new developments in machine design. Better arrangements of parts, long known to be desirable but heretofore impractical, now become entirely feasible as a result of the new type bushing. The substitution of ball bushings (*Please turn to Page* 116)

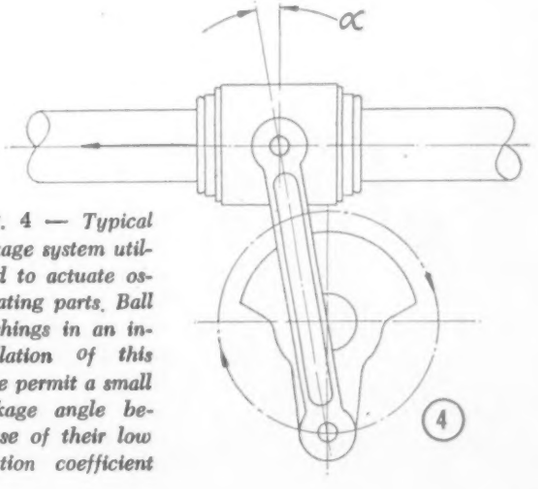
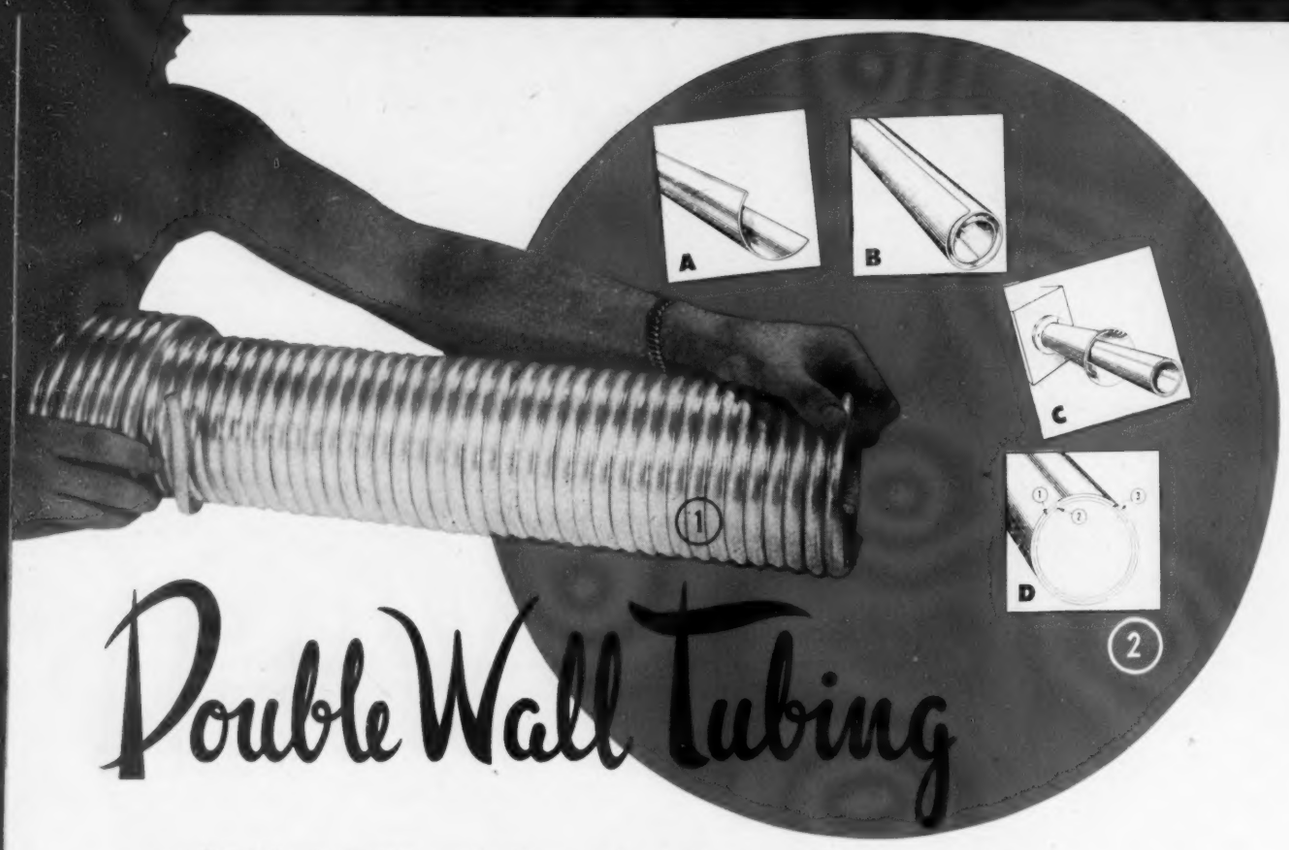


Fig. 4 — Typical linkage system utilized to actuate oscillating parts. Ball bushings in an installation of this type permit a small linkage angle because of their low friction coefficient



Double Wall Tubing

. . . combines high ductility and other mechanical properties with corrosion resistance. Bonded joints cannot be separated at temperatures under melting point of base metal

DOUBLE wall tubing which combines high strength, ductility and corrosion resistance with some of the features of seamless tubing—especially in small diameters—is now being produced of Monel and nickel in standard sizes from 3/16 to 5/8-in. OD and in lengths up to 100 ft.

A product of Bundy Tubing Co., Detroit, the tubing has been available on special order in Monel for several years, and during the war was widely used for aircraft engines. It is also suitable for beverage, food, chemical, refrigeration, and other industries where corrosion and harmful metallic contamination must be avoided.

Standard production of Monel and nickel tubing in the present range of sizes now makes it more readily available for many applications where the problem of smaller tubing with suitable characteristics has frequently arisen. Tubing in larger sizes is also available on special order. Both standard and special sizes can be provided in the "as-rolled" or rolled and cold drawn condition.

Ductility of the nickel and Monel tubing is such that it can be coiled or formed into other shapes without difficulty or without danger of fracture. The tables show the mechanical properties of both Bundyweld nickel and Monel tubing and also the standard sizes and wall thickness in which this tubing is carried in stock.

For beer coils nickel tubing has a number of advantages, many of which also apply to other service as well. Its first cost is no higher than that of the conventional tubing, which it is designed to outlast without pitting, corrosion by brines or other agents, or danger of galvanic action. Heat conductivity is such (*Please turn to Page* 120)

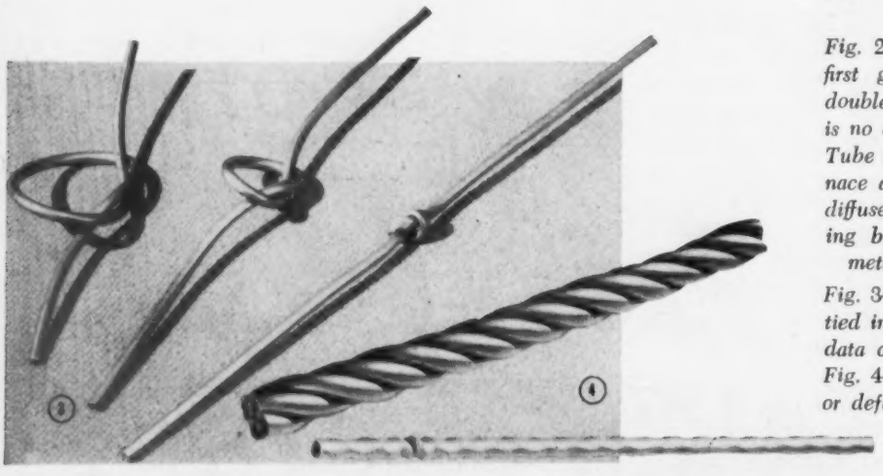


Fig. 1—Double-walled nickel tubing formed into a beer cooler coil

Fig. 2—(A and B) Monel and nickel tube is first given a flash of bonding metal, then double-rolled. Edges are beveled so that there is no appreciable thickening at the joints. (C) Tube is fed continuously into an induction furnace at high temperature. Bonding material is diffused into base metal, forming an interlocking bond. (D) Finished tube—(1) bonding metal, (2) beveled edge, (3) double wall

Fig. 3—Mechanical properties allow tube to be tied into knots but still remain a tube. Photos, data courtesy of International Nickel Co. Inc.

Fig. 4—Tests show how tubing can be formed or deformed without damage to bond between the walls

By DAVID M. SUTTER
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MEASURING IDLE TIME

True causes of idle time, frequently and sometimes mistakenly attributed to indolence of the working force, often are overlooked by management in its efforts to increase per man output

ONE of the most pressing problems facing industrial executives these days in their efforts to bring down costs to somewhere near their prewar level is the factor of labor productivity, and the persuasion of working people generally that the only way to earn more is to produce more. Estimates of the decline in worker productivity from its prewar level range from 20 to as much as 45 per cent. Whatever the decline may be, the fact is that it takes more working people to handle less work than prewar, and this is a basically unsound condition. The facts of the national economy today point unequivocally to the absolute necessity of all manufacturing concerns lowering their production costs.

Blame for the decline in productivity is ascribed by many to the faulty philosophy of union labor which too often has been propagandized by union leaders for purposes of maintaining friction between unions and management. The old familiar term of "speedup" has been dragged from its resting place of the past ten years and slapped generally on any effort on the part of plant operators to improve productivity. Meanwhile campaigns of hate have been engineered by union leaders against anything remotely resembling an "incentive" plan or an "efficiency" method.

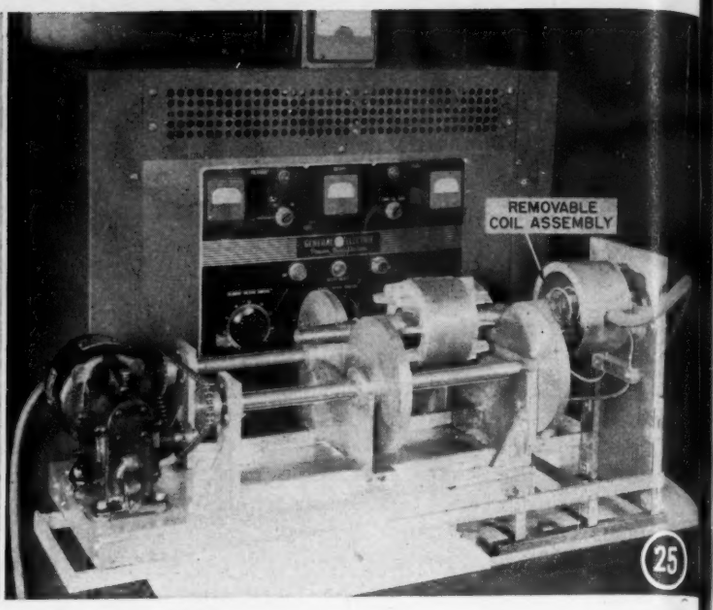
Incentive or piecework systems are still in wide use in industry, particularly in smaller plants but, starting in 1937 organized labor under the CIO has moved steadily in the direction of throwing them out of union contracts in favor of straight-time hourly rates. Particularly in the automotive industry has this been true. Part of the blame for this trend springs from industry's own actions in earlier years—failure to adhere to piece rates once established.

Without championing either management or labor and without wishing to place blame on either, it may be stated fairly that there is in all manufacturing a factor of major importance, often overlooked, and it is "idle time." By this is not meant the deliberate idling of working people such as is practiced in the "slowdown," but rather idle time which too often has been accepted as inherent in any manufacturing plant.

Many causes of idle time might be named, such as poor materials handling, insufficient stock at machines, defective equipment, improper tooling resulting in breakdowns or scrap, improperly located equipment, poorly co-ordinated purchasing policies and others. These elements often may be completely overlooked by management in its efforts to increase per man output, and the resultant low productivity arbitrarily assigned to indolence on the part of the (*Please turn to Page* 118)

Modern manufacturing demands that every machine operate at high efficiency to keep pace with other machines with which it is linked by materials handling systems. Operators of bevel gear generators, left, are protected against blame for tieups caused by inefficiences elsewhere in the line, a Chronolog at each machine recording vital facts on individual performance

Tieups due to shortcomings of tooling, etc., are recorded "chapter and verse" by Chronolog attached to multiple spindle automatic, right



Induction Hardening OF STEEL

Various production fixtures that assure uniformity of product, together with a complete discussion on metallurgical aspects of hardening steel based on the formation of austenite, are detailed in this third article of a series

AFTER the inductor coil and quenching fixture are designed for heat treating a special part, there remains the problem of building a fixture to perform the operation on a production basis. This means designing a device that minimizes the human element to assure uniformity in the finished product, and to give maximum production.

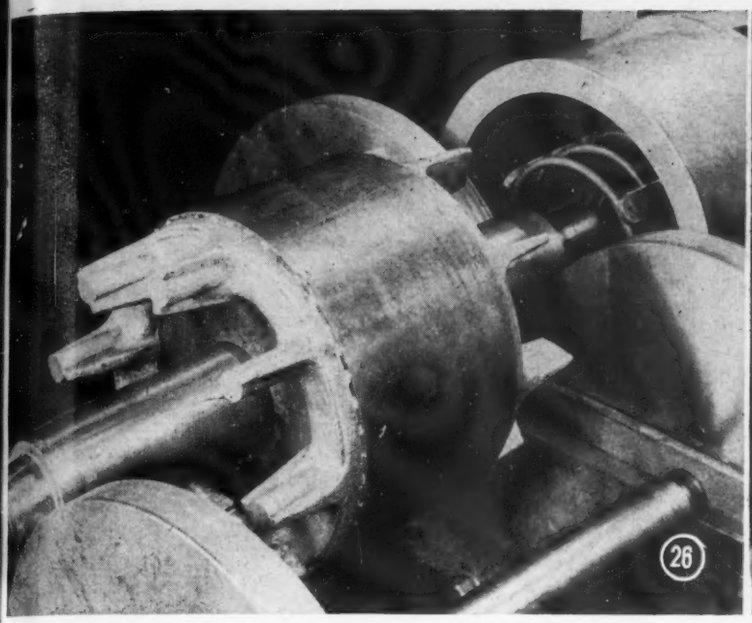
Each fixture, whether hand operated or automatic, must provide sturdy mounting for the inductor coil and quench. Each also must provide a means for positioning the part so that each successive part is heated and quenched exactly the same as the one before it.

Most fixtures for induction hardening fall in one of these three groups: Manual, semiautomatic and completely automatic.

Manual Fixtures: For parts on which the production rate is low or which, because of size and shape limitations cannot be adapted to automatic handling, the hand-operated fixture is generally used. This means the operator loads the part into position in the fixture and pushes a button to start the heating operation. To insure uniform results, the heat and quench cycle are controlled by a timer which is set according to predetermined results. At the end of the quench cycle, operator removes the part and loads the next one.

Typical examples of this type of fixture are illustrated in both Figs. 2 and 5, STEEL, Jan. 13, 1947. As shown in both illustrations, a rotating device is provided to rotate parts during heating and quenching. Rotating smooths out any nonuniform heating resulting from distortion of the magnetic field where the leads leave the coil. In these instances, the rotating device is mounted under the work table sink with the spindle for holding the gear extending up into the fixture.

Operation of a single manually-loaded fixture utilizes the heating ability of an oscillator only part of the time. The quench time often may be as long as the heat cycle. In this case it may be utilized for heating of a second part by the use of a two-position work table with a transfer switch for switching the power from one position to the other. As soon as the power goes off in one position it can be turned on in the other, and the second part heats while the first quenches. Electrical interlocks make it impossible for power to be switched from one position to the other during a heating cycle. The quantity of production from one oscillator can be increased consider-



By DR. D. L. MARTIN
Metallurgist
Research Laboratory
And
R. A. GEHR
Application Engineer
Industrial Heating Engineering Div.
General Electric Co.
Schenectady, N. Y.

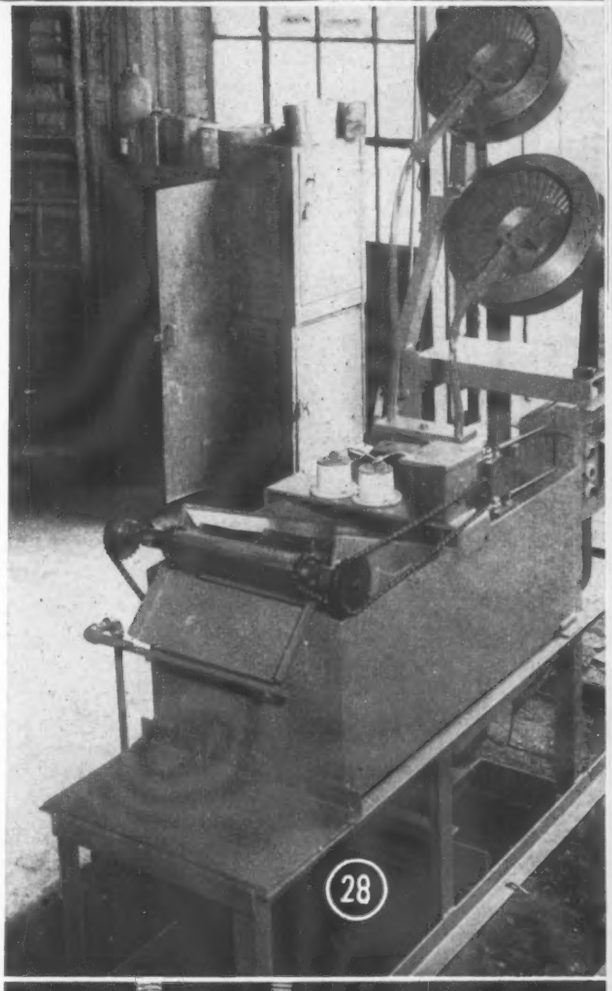
Fig. 24—Two-position work table for a 50 kw electronic heater, with duplicate fixtures for hardening starter ring gears. Gear in one fixture is heated while that in the other is quenched and unloaded. This uses the heating ability of the oscillator for nearly full time

Fig. 25—Fixture for holding and rotating a motor rotor shaft and rotor while teeth on the end of shaft are being induction hardened by a 15 kw heater. Fifteen different size shafts can be hardened with this setup, using only five different inductor coils

Fig. 26—Motor rotor shaft, Fig. 25, in position for heating

Fig. 27—Semiautomatic fixture for induction-annealing tip of thumbscrew. Production rate: 100,000 per day

Fig. 28—Completely automatic pin-hardening machine. Unhardened pins are dumped into the two hoppers which feed them to inductor coils where they are heated and dropped automatically into quench tank. Conveyor then carries them out of tank



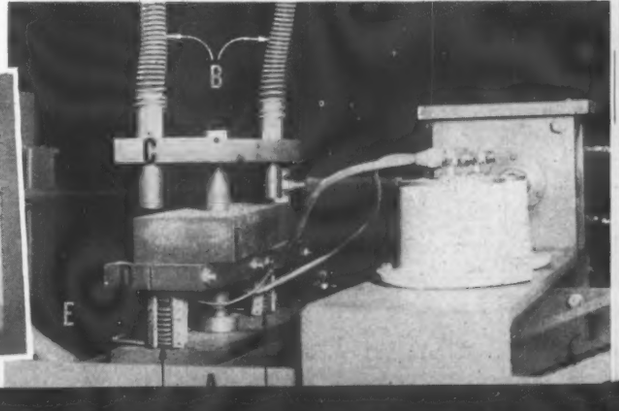


Fig. 29—Feeding mechanism of machine in Fig. 28. Two pins are heated at one time, one in each coil, utilizing full output of a 15 kw induction heater; heating time is 2 sec; production rate 3600 per hour

Fig. 29a—Longitudinal section of pin hardened in machine, Figs. 28 and 29, etched to show hardness pattern

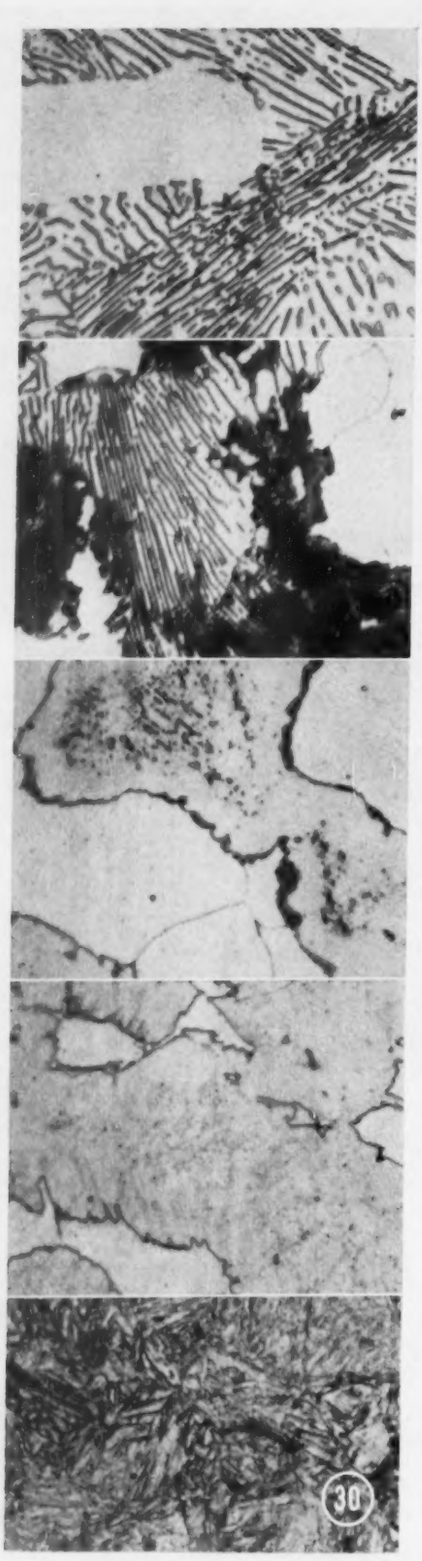
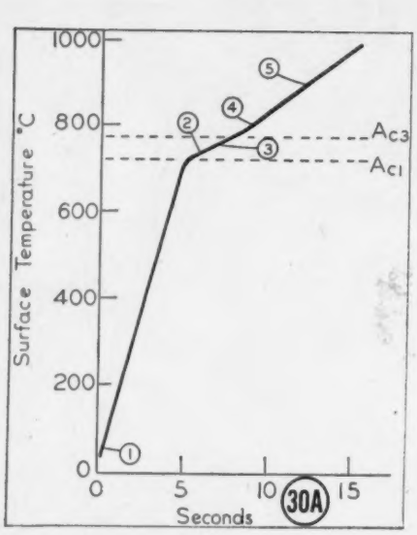


Fig. 30—Heating curve and microstructure of an induction-heated SAE 1050 steel. Samples, bottom to top, were heated to temperatures, 30 A, water-quenched prior to micro-examination. Microstructures were taken near the surface; X1000



ably, or even doubled, depending upon the length of the quench cycle with respect to the heating time. Fig. 24 shows a 50-kw output vacuum tube oscillator, equipped with a two-position work table and duplicate fixtures for hardening starter ring gears.

The illustration in Fig. 23 (STEEL, January 20, 1947) shows a manually-operated fixture for hardening wearing surfaces of a clutch plate. Since there are several similar surfaces on a single clutch plate, the fixture is designed so part is indexed in the down position, and is moved up into the coil for heating.

In the manufacture of production items it is often convenient to do some assembly work before heat treating. A good example of this is a motor shaft on which the rotor has already been located. A spiral gear is then cut on the end of the shaft, and is hardened by induction heating in the fixture shown in Figs. 25 and 26.

Motor and disks are mounted on a carriage that moves back and forth on rails for ease in loading and positioning. Proper coil design made it possible to do fifteen different size shafts, varying in diameter from 9/16 to 2¼-inch with only five different coils, thus resulting in a considerable saving in setup time for hardening various sizes. Changing coils is accomplished by loosening two bolts, taking out the removable Textolite board, on which the coil is mounted, and replacing it with the proper coil assembly.

Semiautomatic Fixtures: Where production-line demands require several hundred parts or more per hour, it is necessary to devise some means for more rapid handling. For parts which cannot be adapted to automatic feeding, manual loading is required. The parts are placed in position on a moving conveyor or rotating table, that carries them into the inductor coil for heating, and on into the quench for hardening. As the hardened part comes out of the quench, it is automatically ejected.

Fig. 27 shows an excellent example of a semiautomatic fixture for induction heating. The fixture here actually does an annealing job. However, it could easily be modified to perform as a hardening machine by merely adding a quench where the part leaves the inductor coil.

Problem in this case was to provide

Fig. 31—Typical isothermal reaction curve for formation of austenite. Comparison of microscopic and hardness methods of measuring extent of reaction. Half-hard and hard values are indicated

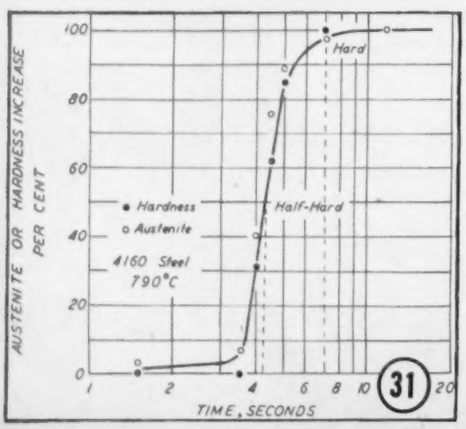
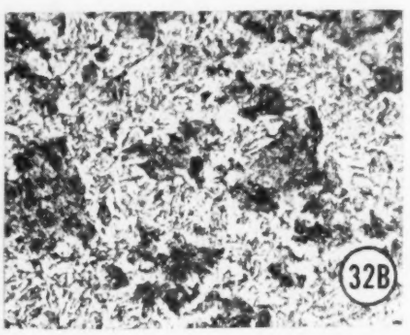
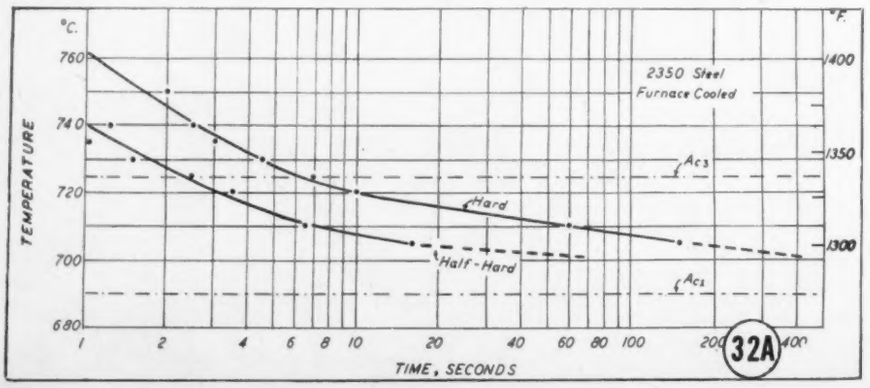
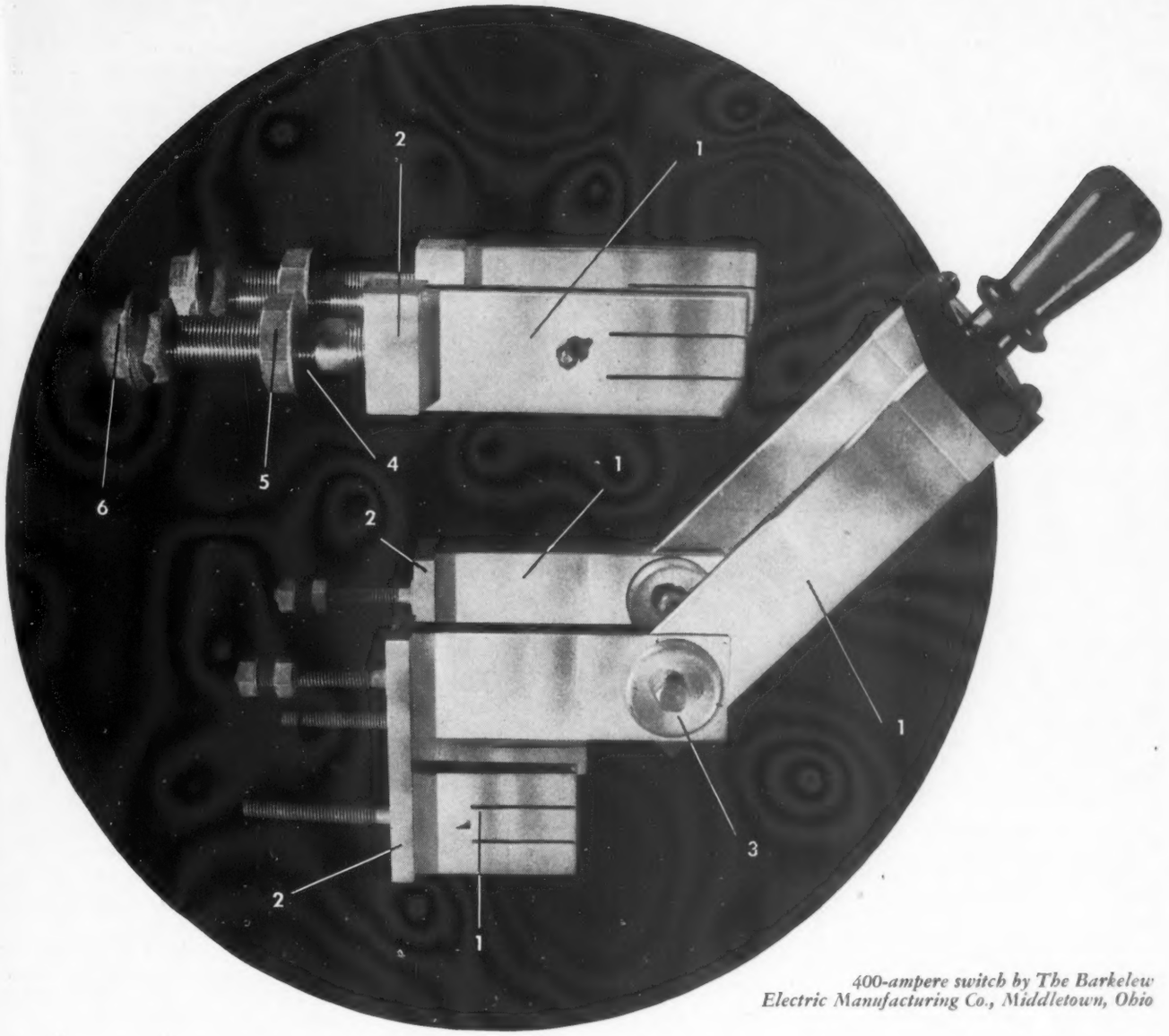


Fig. 32—Austenitizing TTT diagram for furnace-cooled SAE 2350 steel. Initial microstructure is given in B







400-ampere switch by The Barkelew Electric Manufacturing Co., Middletown, Ohio

WIDE VARIETY OF REVERE METALS PERMITS EXACT SPECIFICATION TO MEET CONDITIONS OF USE

Note the number of different Revere Metals used by Barkelew in this switch, in order to assure low losses, reliability, accuracy, long life and economical manufacture.

1. *Electrolytic Copper.* For full conductivity.
2. *Free-Cutting Copper.* For quick, economical, trouble-free machining; in this case, producing sharp, clean, accurate slots and tapped holes in the copper base blocks. Free-cutting copper is rated in excess of 70% machinability of free-cutting brass, depending on type of operation.
3. *Herculoy.* Has the strength of mild steel, the corrosion-resistance of copper. The Herculoy washers in this switch assure permanence of pressure.
4. *Brass.* Washers, stamped out of sheet.
5. *Free-Cutting Brass.* Nuts, machined from free-cutting rod.
6. *Cast Electrolytic Copper.* For nuts not presenting machining problems.

Materials were very carefully chosen in designing this switch. For example, the hinge block for the high clip must have two slots milled in it to receive the clip leaves; Revere Free-Cutting Copper was selected for its superior machining characteristics. Slots in the lower hinge blocks are sawed all the way through, and here Revere Hard Drawn Electrolytic Copper is suitable.

Revere will gladly cooperate with you in working out the most advantageous application of metals to your products. Revere Metals are: Copper and Copper Alloys, Aluminum and Magnesium Alloys, Electric Welded Steel Tube.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

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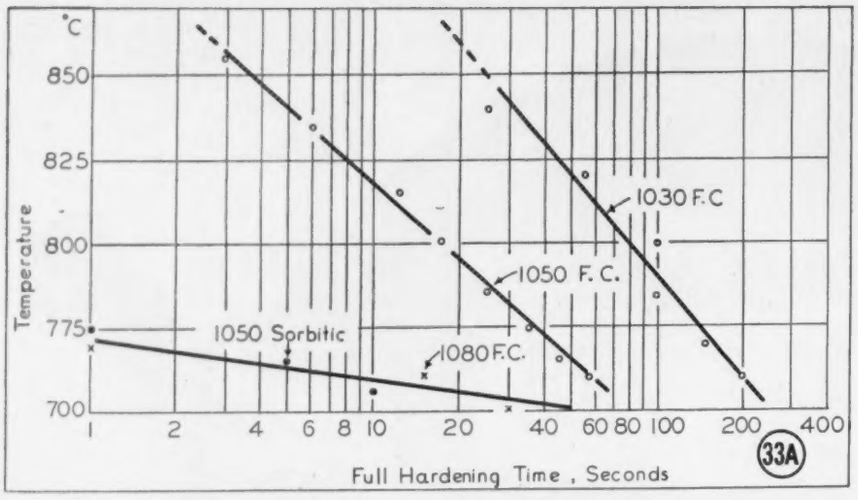
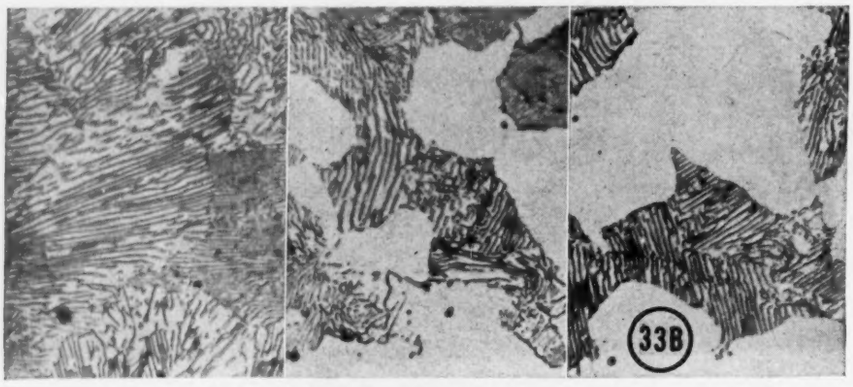


Fig. 33—Comparison of effect of increasing carbon content upon austenitizing characteristics. Initial microstructures of the three steels are given in B



1080 1050 1030

finished thumb screws, with threads hardened to resist wear, but with the tip soft for peening. The solution was to furnace-harden the screws in large batches, then anneal the tips by induction heating. A 5-kw vacuum tube oscillator operating at 530 kc did the heating with two single-turn hairpin coils arranged in series. The production rate was 100,000 thumb screws per 8-hour day.

Completely Automatic Fixtures: The ideal for high-production induction hardening is a machine that is completely automatic after being started. An automatic feeding device, such as a hopper feed, supplies the parts to the machine which heats, quenches and drops the part in a bin ready for the next operation.

Figs. 28 and 29 show a machine developed for hardening pins 1½-in. long and 3/8-in. in diameter. Hardness pattern required is that shown in Fig. 29a. The hardness must be 60 rockwell C or higher. Hardened zone is approximately 0.050-in. deep at the center, and the ends of the pin are soft so that they can be peened over without cracking. The steel used is SAE 1060.

Heating is done by two inductor coils in series (A) Fig. 29; which are fed automatically from the hoppers, (B); and by means of sliding plate, (C). Another sliding plate, (D), which is synchronized with plate, (C) drops the pin into the quench tank (E). In the bottom of the quench tank it is picked up by a conveyor (F) which carries it up out of the tank and drops it into a bin.

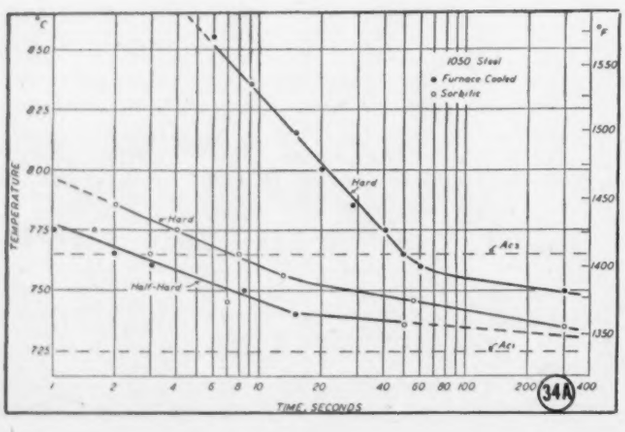
Heating time for two pins (one in each coil) is 2 sec, or one pin per second. The heating operation utilizes the full output of a 15 kw vacuum tube oscillator at 530 kc.

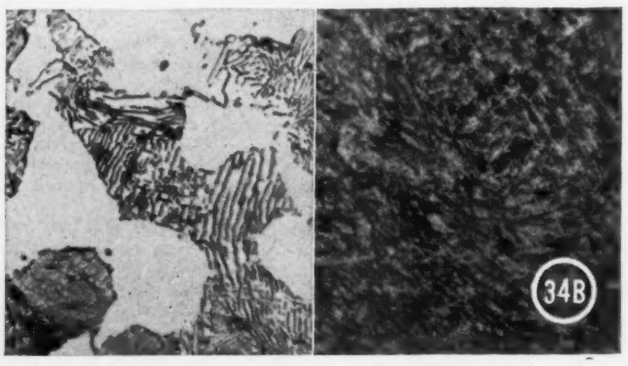
For hardening pins the full length, an automatic machine has been developed for progressively hardening the pins as they pass through a single-turn inductor coil and into a quench. Pins of SAE 1045 steel ½-in. in diameter can be case hardened to depth of 0.015 to 0.020-in. at a rate of 2 in. per sec, using a 15 kw oscillator at 525 kc. Deeper or shallower cases are obtained by decreasing or increasing the speed. Correspondingly higher speeds are obtained by increasing the power available. Pins as small as ⅛-in. in diameter or as large as 4 in. may be handled in this manner.

Metallurgical Aspects: The induction hardening cycle involves two main operations—heating to form austenite, and quenching to form martensite. It follows that ability to transform the steel to austenite, and the austenite to martensite is of fundamental importance in induction hardening, and that the success of the method for some applications depends upon the metallurgical response of the steel to the heating and quenching treatments.

A consideration of the metallurgical aspects of induction hardening may best

Fig. 34—Effect of initial microstructure on austenitizing characteristics of an SAE 1050 steel. Fig. 34A—Austenitizing TTT curves. Fig. 34B—Initial structures of furnace-cooled and sorbitic samples: X1000





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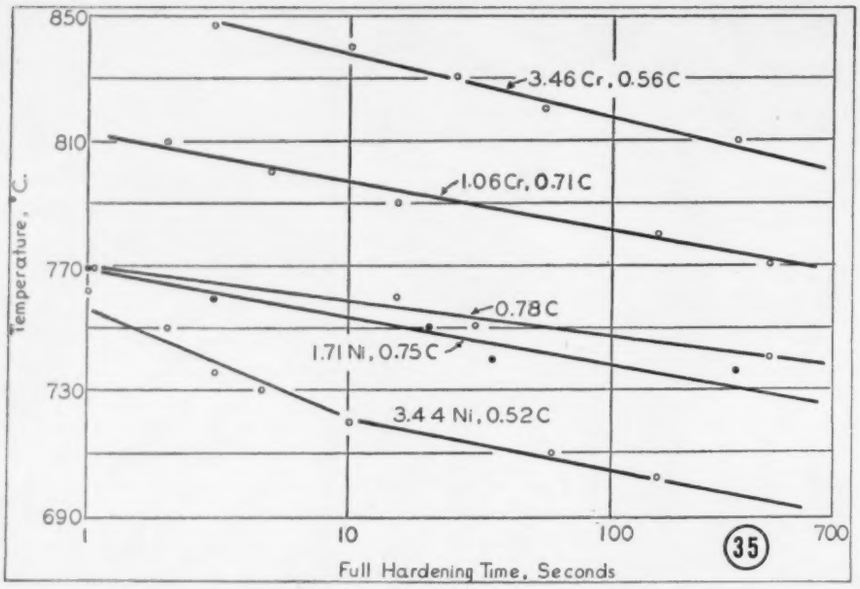


Fig. 35—Comparison of austenitizing curves of several nickel and chromium steels. Only the hard curves are plotted

be made on the basis of (A) the formation of austenite, and (B) the formation of martensite from the austenite.

Formation of Austenite: In furnace hardening of steel there is no great problem related to austenitization, as it is generally possible to heat the sample to any desired temperature, and hold until the sample is transformed. The conditions are quite different for induction hardening where the austenite reaction occurs during continuous heating, as shown in Fig. 30 for an SAE 1050 steel. The austenite transformation is initiated in the pearlite areas at a temperature above Ac_1, and these nuclei grow as the temperature is increased until the sample is transformed completely to austenite. For the steel shown in Fig. 30 it was necessary to heat to a temperature of about 850° C to make the transformation complete.

It has been established by many investigators that austenite forms by a process of nucleation and growth. [10, 11, 12, 13, 14]. The nuclei form at the carbide-ferrite interface, and grow by diffusion of carbon into the low-carbon areas, as in Fig. 30. Roberts and Mehl have shown that both the rate of nucleation and rate of growth are structure-sensitive, and specifically pointed out in an eutectoid steel that, as the pearlite spacing is decreased, the rate of nucleation and rate of growth increase. [10]

Importance of initial structure in induction hardening was emphasized by many investigators who observed that an initial sorbitic structure has excellent austenitizing response, [15, 16, 17, 18]. The reason is clear—the cementite is uniformly distributed in a sorbitic sample, and the diffusion path of carbon is therefore shorter than in a normalized structure with free ferrite and pearlite.

The time to transform aggregates of ferrite and cementite into austenite depends upon the reaction temperature, the composition of the steel and initial microstructure. A convenient method of showing the effect of these variables on the austenitizing characteristics is by the use of time: Isotemperature: transformation diagrams, sometimes referred to as TTT diagrams.

TTT Diagrams: The basis of these diagrams is the isothermal reaction curve, an example of which is shown in Fig. 31. The experimental technique for determining the isothermal reaction curve consists of heating small, thin samples in molten lead at a constant temperature for various intervals of time, then measuring the degree of progress of the transformation by the increase in hardness of the quenched samples. [18]. The half-hard and hard values are taken from the isothermal reaction curve, and

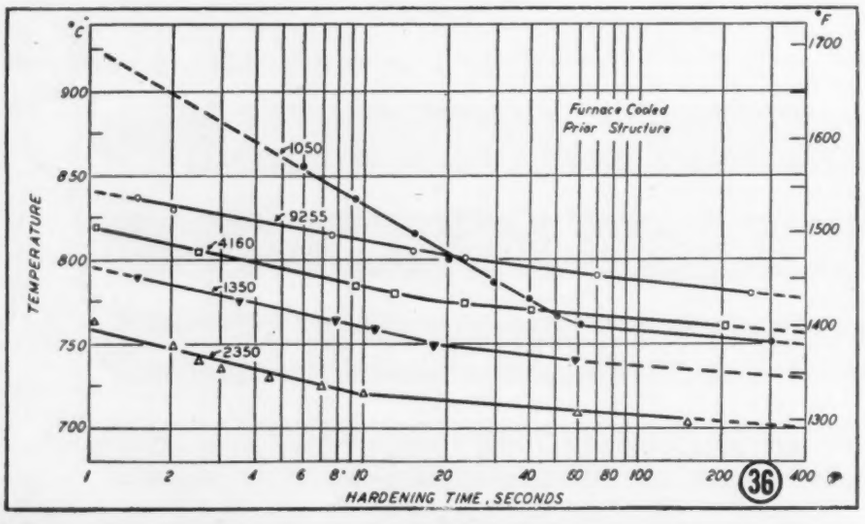
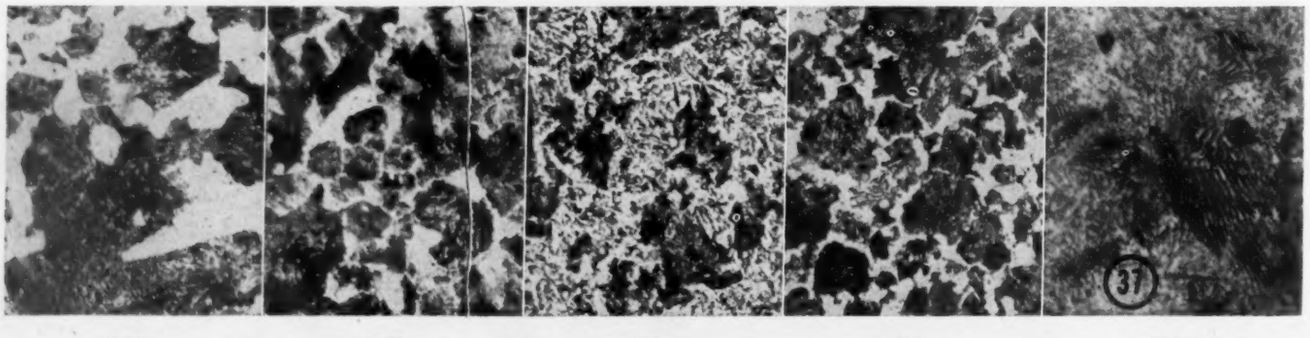


Fig. 36—Comparison of hard TTT curves for five steels. Microstructures of these steels are shown in Fig. 37

Fig. 37—Microstructures of furnace-cooled steels. TTT curves for these steels are plotted in Fig. 36. Initial magnification was 250 except for the 4160 sample which was 1000



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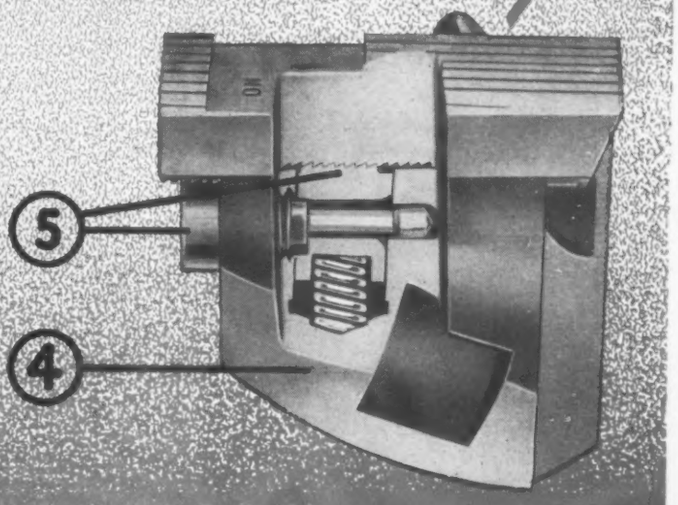

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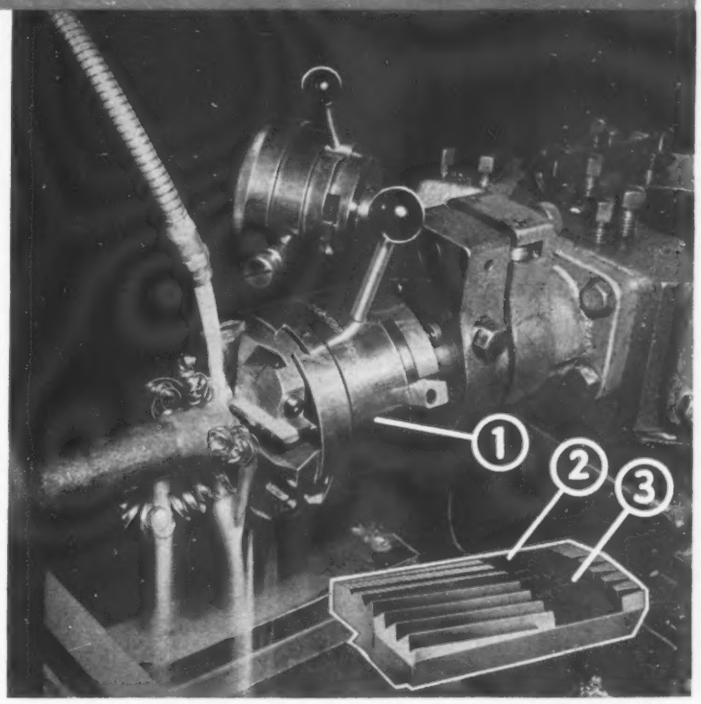

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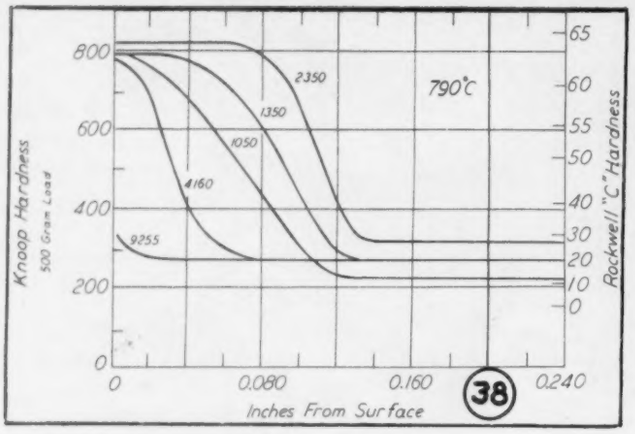


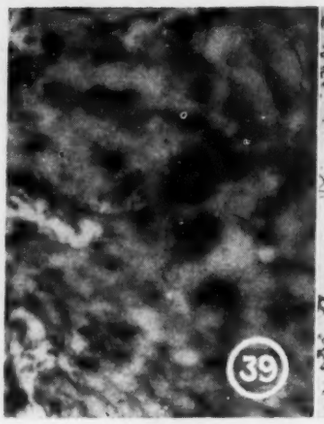


Fig. 38—Comparison of hardness penetration curves for five steels induction-heated to 790° C. Composition of these steels are listed in Table I

Fig. 39—Pearlite ghosts in induction-hardened eutectoid steel; X1000

Fig. 40—Incomplete austenitized sample of SAE 1050 steel; X500

plotted against the reaction-bath temperature, as shown in Fig. 32 for a series of temperatures above Ac_1 temperature.

The austenite reaction for the SAE 2350 steel, Fig. 32, proceeds very slowly near the Ac_1 temperature, but the rate increases with an increase in temperature until at about 760° C the reaction is completed in less than a second.

Effect of Carbide Distribution: A comparison of the austenitizing characteristics of three plain carbon steels is made in Fig. 33a. The improved response of the eutectoid steel probably is related to the uniform distribution of cementite, compare structures in Fig. 33b. The carbon must diffuse a greater distance in the low and medium carbon steels because of the massive free ferrite and, accordingly, additional time is required to complete the reaction.

Importance of carbide distribution is further emphasized in Fig. 34 where effect of initial microstructure is shown to have a great effect on the austenitizing characteristics of a medium carbon steel. As expected, the sorbitic sample was found to austenitize faster than the furnace-cooled sample containing massive free ferrite.

In view of these results it is clear why attention should be given to the initial microstructure and carbon content of the steel being induction hardened. This is particularly true for applications involving rapid heating where it is important to control the depth of hardening.

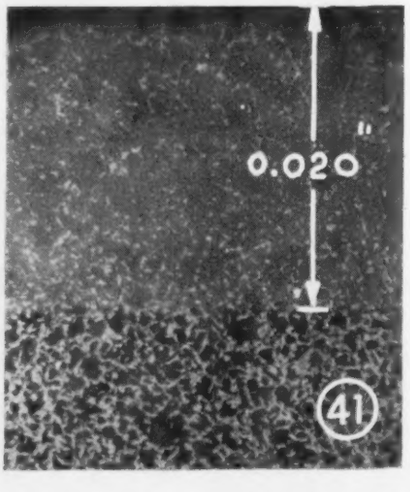
Effect of Alloys: The effect of alloy additions on the austenitizing characteristics of steel is related to their effect upon three factors—transformation temperature range, eutectoid composition and composition of the ferrite and carbide.

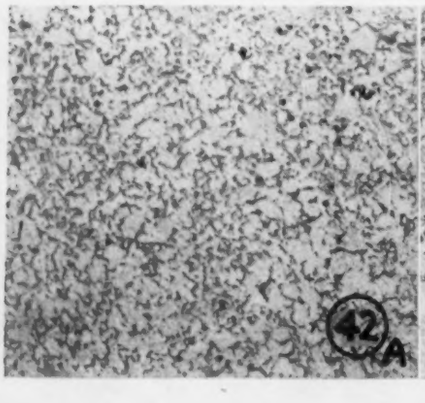
Of elements commonly added to steel, nickel and manganese lower the Ac_1—Ac_3 temperatures, whereas molybdenum, chromium, tungsten, and silicon raise the transformation temperature[19]. The shifting of the TTT curves due to the lowering or raising of the Ac_1—Ac_3 temperatures is shown in Fig. 35 for a series of nickel and chromium steels of approximate eutectoid composition. The addition of nickel (also manganese) promotes the austenitization of steel by lowering the Ac_1—Ac_3 temperatures, and therefore, the presence of these alloys in steels is favored where rapid austenitizing response is desired.

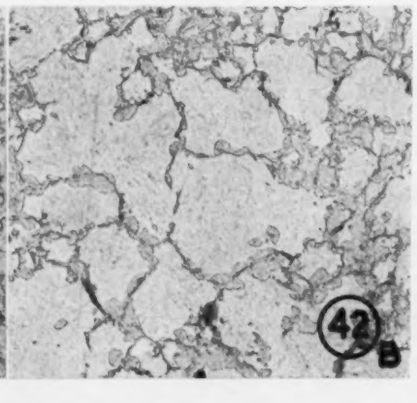
Bain indicated that the amount of carbon to form the eutectoid composition decreases as the alloy content of the steel increases[19]. The result of this lowering of the eutectoid carbon content by alloying is the presence of less free ferrite in slowly-cooled medium carbon alloy steels. Thus, a furnace-cooled medium carbon alloy steel has a more uniform distribution of carbide, and as a result, offers a better response to austenitization than a plain carbon steel, other factors such as Ac_1—Ac_3 temperatures being equal. This is partially verified by the TTT curves in Fig. 36, and the photomicrographs in Fig. 37 of a series of approximately 0.50 per cent carbon steels. The SAE 1050 steel, because of large quantities of massive ferrite, requires a longer austenitization treatment than the four alloy steels. Of course, the SAE 1350 and 2350 steels will have improved austenitizing response because of the lower Ac_1—Ac_3 tempera-

Fig. 41—Undissolved ferrite in an induction-hardened SAE 1335 steel shaft

Fig. 42—Comparison of austenite grain size obtained during furnace and induction heating of an SAE 1030 steel; X100. Fig. 42A—Induction-heated to 975° C; air-cooled to 675° C and water quenched. Fig. 42B—Held at 975° C in furnace for 15 minutes and quenched







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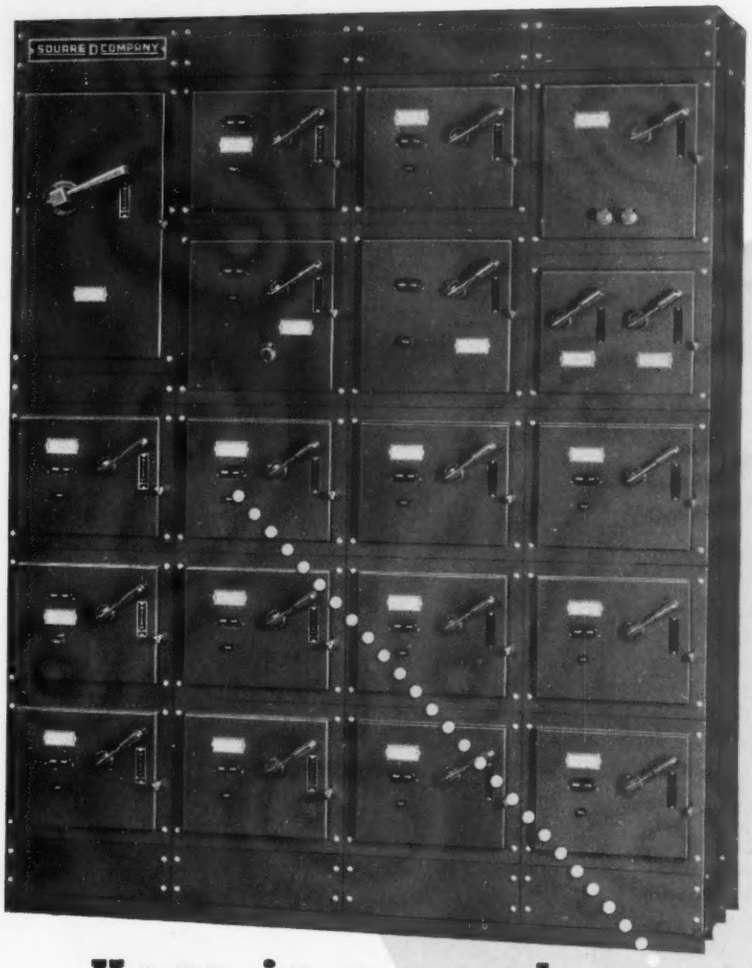

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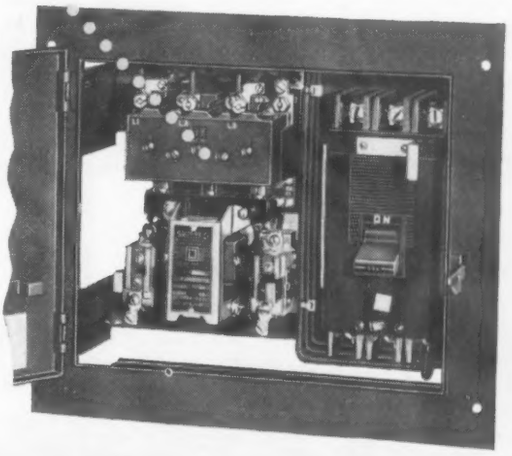

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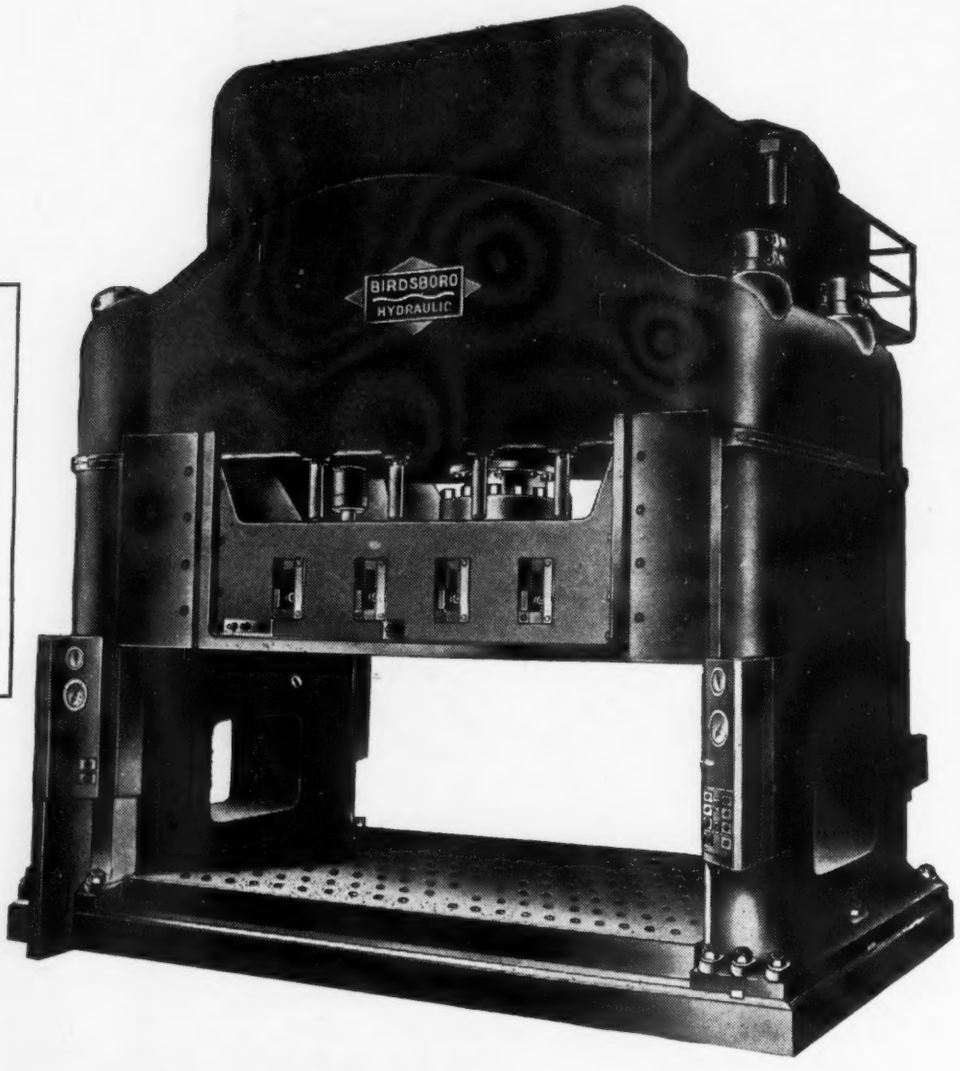

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tures of these steels, Table I, but the 9255 and 4160 steels have higher Ac_1—Ac_3 values, and still require less time at temperatures above 810° C. However, if the distribution of carbide in 1050 steel is made uniform by a quench-temper treatment, as in Fig. 34, response of the steel is improved, equalling that of SAE 1350 steel in Fig. 36. From a practical viewpoint, this means that low alloy steels may possess a better austenitizing response than plain carbon steels, even though they possess higher critical temperatures.

Hardness penetration curves in Fig. 38 provide additional evidence of the better austenitizing response of the SAE 1350 and 2350 steels. The samples were induction heated to 790° C, and the hardness penetration data were measured on the cross-section of the quenched samples[18]. Note that the nickel and manganese steels are hardened to a greater depth in comparison to the plain carbon 1050 steel and the SAE 4160 steel, which were not hardened completely at the surface. That is free ferrite or carbides are still present in the martensitic matrix.

TABLE I

Chemical Analyses and Critical Temperatures

Type	C	Mn	Si	Ni	Cr	Mo	Ac1	Ac3
1050	0.47	0.73	0.11	....	....	....	725	765
1350	0.50	1.46	0.43	....	....	....	710	750
2350	0.52	0.32	tr.	3.44	0.28	<.1	690	725
4160	0.60	0.90	0.03	tr.	1.15	0.22	750	775
9255	0.52	0.91	1.88	....	....	....	770	800

The partition of the alloying elements between ferrite and carbide may be expected to influence the austenitizing characteristics. If the alloying elements are dissolved in the ferrite, the austenitizing response is likely to be better than when the alloys are present in the carbide phase, because of the slow solution rate of alloy carbides. Therefore, the carbide-forming elements such as molybdenum, tungsten, vanadium, and chromium are likely to retard the austenite formation more than the elements, nickel and manganese for example, which are dissolved in the ferrite.

Bowman and Parke studied the effect of austenite transformation temperature on the partition of molybdenum between ferrite and carbide in a variety of carbon steels, and found the carbide phase formed at low transformation temperatures contained less molybdenum than the carbide formed at high temperatures[20, 21, 22]. A summary of some of the partition results are given in Table II. In view of the lower molybdenum content of the carbides in the tempered samples, it seems logical to expect those samples to austenitize faster on heating than the isothermally transformed specimens containing the complex carbide phase. The elements tungsten, chromium, vanadium, etc., also are carbide-formers, and may be expected to be similar to molybdenum in their effect on the austenitizing characteristics. Although sufficient data are not available, it appears logical to say that when the alloying element is present in the carbide phase, the austenite reaction will be slower than when the alloying element is in solution in the ferrite.

TABLE II

Partition Per Cent	Isothermal Transformation, ° F. 1300	1200	1100	Quenched & Tempered at 1300° F. for 150 hrs.	250 hrs.
Mo in Ferrite	0.19	0.26	0.39	0.54	0.43
Mo in Carbide	4.02	3.73	3.51	2.23	3.01

Partition of Molybdenum between Ferrite and Carbide in a 0.74C, 0.74Mo Steel.

Note that the quenched and tempered specimens have less molybdenum in the carbide phase than the isothermal specimens.

Nature of the Austenite: It is known that the initial austenite is not homogeneous, but contains carbon and alloy concentration gradients which disappear only after a long homogenization treatment at high temperatures. In addition to the nonhomogeneous austenite there is likely to be undissolved carbides, and perhaps even some undissolved ferrite in samples which exhibit full hardness in the quenched condition. The so-called pearlite ghosts which are frequently observed in induction-hardened samples, Fig. 39, are evidence of the heterogeneous structure resulting from short heating cycles. This structure resembles pearlite in appearance, but possesses the hardness of martensite. In this connection it should be remembered that the hardness test (rockwell or vickers) does not reveal if austenitization is complete, since full hardness can be obtained in quenched structures containing free ferrite. A worthwhile practice is to check the microstructure of representative samples for the presence of free ferrite. For example, the induction sample in Fig. 40 had a hardness of 61 rockwell C, although it contains considerable free ferrite which is likely to have a damaging effect on the fatigue properties.

Importance of Austenitization: The relative importance of the austenitizing characteristics of the steel during induction heating will be dependent to a great extent upon the heating rate, and the limitations made on the depth of the hardened zone. The austenitizing response of the steel becomes a critical factor in the success of the hardening operation, if the heating rate is high (i.e., the heating time for complete austenitization is in the neighborhood of 1 sec), and/or the depth of the hardened zone must be maintained with a specified value. For example, consider the shaft, illustrated in Fig. 7 (STEEL, January 13, 1947) in which it was desired to obtain a martensitic zone of about 0.015-in. with a 15 kw, 530,000 cycles induction oscillator. It was possible to harden to this depth with the SAE 1350 steel, but not with an SAE 1335 steel, Fig. 41. The lower carbon steel, with more free ferrite, required a longer heating period to dissolve the ferrite, and this resulted in a greater depth of hardening.

For many applications, the austenitizing response of the steel is not critical, and a wide variety of plain carbon and low alloy steels have acceptable characteristics. The SAE 1045 steel is popular for many induction hardening jobs, and will generally prove satisfactory. However, if necessary, the response of the steel can be improved by increasing the carbon content, distributing the carbides uniformly throughout the steel by alloy additions or heat treatment, lowering the Ac_1-Ac_3 transformation temperatures by the additions of nickel or manganese, and avoiding the carbide-forming elements, such as Mo, W, V, etc., which may retard the solution of the carbide-phase in the austenite, depending upon the partition of the elements between the ferrite and carbide as considered previously.

Method used to improve the austenitizing characteristics (by increasing carbon content, alloying additions, or heat treatment) will be governed by the physical properties required, and the economic factors involved. Thus, an SAE 2350 steel has excellent austenitization response, but the higher cost of this material will limit its commercial use. (It costs approximately 90 per cent more than an SAE 1050 steel).

The high carbon steels of the SAE 1060 to 1095 type have excellent response, and are perhaps the best suited for induction hardening applications where a high hardness and a thin martensitic case are desired. Lauderdale obtained satisfactory surface hardening results with a 1 per cent carbon steel for shuttle valves, valve plungers, and piston rods, and considers that the premium price paid for this material is more than offset by the guarantee that uniform hardness will be attained in re-

(*Please turn to Page* 107)

Atomic Power Plant

. . . . expected to be in operation by 1948. It is planned that the energy released from nuclear fission will be utilized in equipment of present design modified for this new fuel

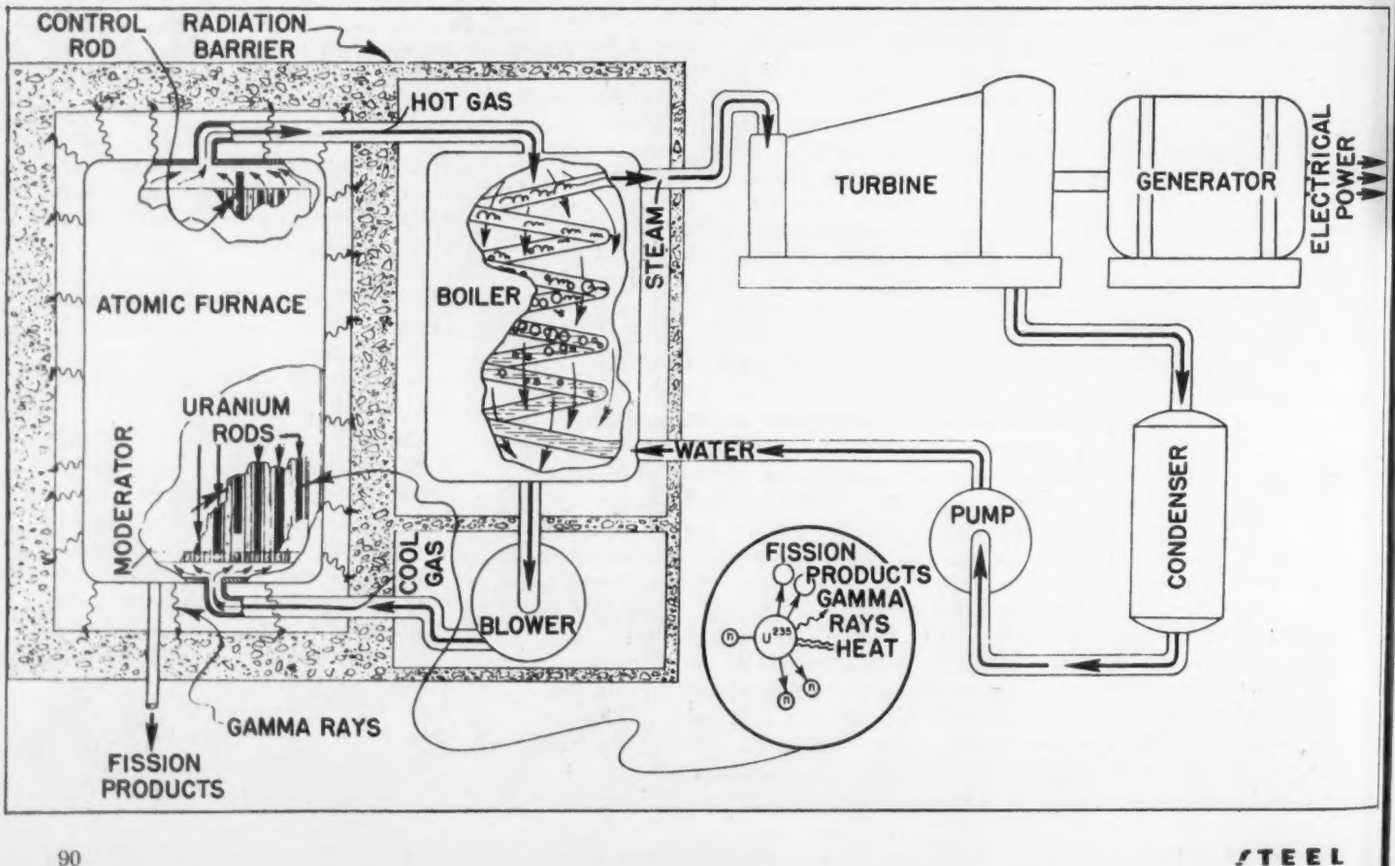
WHILE a lot of ground remains to be covered before it will be possible to put atomic energy usefully to work, there soon should be a much clearer understanding of the problems involved as a result of two prime contracts recently awarded by the War Department's Manhattan Project. One of these was placed with the Monsanto Chemical Co., St. Louis, and the other with the General Electric Co., Schenectady, N. Y. Some worthwhile findings, according to a report by Major General L. R. Groves, chief of the Manhattan Project, should result in the latter part of 1947 and in 1948.

Monsanto Chemical Co., which operates the government-owned Clinton Laboratories at Oak Ridge, Tenn., is working on a power pile based on preliminary designs by Dr. Farrington Daniels, chemistry professor at the University of Wisconsin and chairman of the Argonne National Laboratory, Chicago. A number of problems which remain to be solved for the preliminary designs are being worked on at Oak Ridge, under the direction of Drs. C. Rogers McCullough, E. P. Wigner and James H. Lum, with Dr. Daniels in the capacity of consultant. Also co-operating in the program is Dr. W. H. Zinn, of the Argonne National Laboratory.

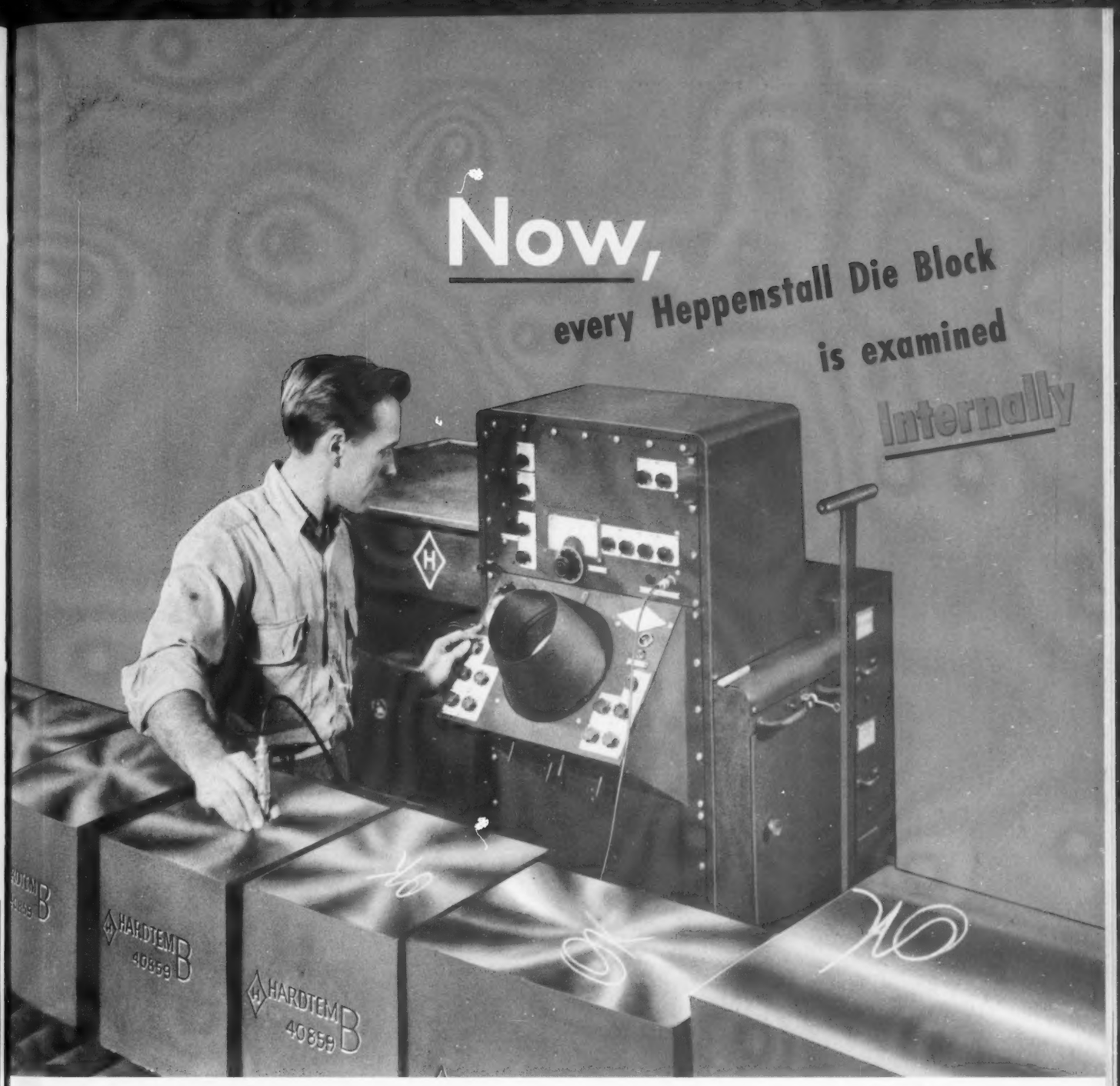
These problems include: "The actual size and shape of the fuel unit, the method of transferring heat from the pile to the heat engine or prime mover, the problem of loading and unloading the pile, the problem of automatic control of the pile and its accessory equipment including steam turbine and generator, and the problem of shielding the whole unit for protection against radiation." When sufficient answers have been developed, the final design will be frozen and an experimental plant will be erected at Oak Ridge. Dr. Lum estimates that the start of operations at the experimental pilot plant may be delayed to 1948. This is not only because of the experiments that must be made to freeze the design, but also because of the difficulties incident to procuring equipment of the special type needed in installation.

The first operation will be to provide heat energy for steam electric generation, the pile operating at conventional central station temperature levels ranging from 630 to 940° F. No indication may be had as yet of the capacity of the pilot plant. Emphasis is being laid on a heat source of long life and great reliability; these attributes are of particular importance because of the radio activity which renders any pile, once operating, difficult and dangerous to shut down for maintenance. Present thinking envisions the possibility that all of the equipment from the boiler through the generator will be of relatively conventional type.

At the invitation of the Monsanto company, the following individuals and companies are rendering consulting service with the power pile program: F. H. Colvin, Point Pleasant, N. J.; Dr. Farrington Daniels, University of Wisconsin; Combustion Engineering Co., New York; Commonwealth Edison Co., New York;



Preliminary design of the Daniels atomic power plant with which Monsanto Chemical Co. is working to solve some of the problems confronting the use of atomic energy. When satisfactory solutions are obtained, a pilot plant will be constructed at the Oak Ridge experimental center



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Foster Wheeler Corp., New York; Frederick Fladder Inc., Tonawanda, N. Y.; General Electric Co., Schenectady, N. Y.; J. E. Willard, University of Wisconsin; J. I. Yellot, research director, Locomotive Development Committee (a research group sponsored by several railroads and coal companies), Baltimore; National Carbon Co., Atlanta, Ga.

By invitation of the Monsanto company, the following organizations are assisting on power plant problems: Allis-Chalmers Co., Milwaukee; Babcock & Wilcox Co., New York; Bureau of Ships, United States Navy, Washington; Frederick Fladder Inc., Tonawanda, N. Y.; General Electric Co., Schenectady, N. Y.; National Advisory Committee for Aeronautics, Washington; Northrop Aircraft Corp., Hawthorne, Calif.; Tennessee Valley Authority, Knoxville, Tenn.; Purdue University, Lafayette, Ind.; Wright Aeronautical Corp., Woodbridge, N. J.; University of Wisconsin, Madison, Wis.; University of Chicago, Chicago.

General Electric Co., which operates the Hanford Engineer Works, Pasco, Wash., is working on several different designs of nuclear reactors, or piles, for the generation of electric power. No basic design yet has been agreed on. The General Electric program is under the direction of Dr. C. G. Suits and "includes research on a wide range of equipment for nuclear power plants, and the study of ship propulsion by nuclear energy." For carrying on this work a $20 million nuclear research laboratory (see STEEL of Nov. 18, p. 70) will be built near Schenectady and operated by the General Electric Co.

Atomic Energy a New Fuel

In order to develop a better understanding of the significance of the prime contracts placed with the Monsanto Chemical Co. and the General Electric Co., General Groves has released the following "nontechnical" discussion of the problems involved:

In a consideration of the generation of electric power from atomic energy it is important to realize that atomic or nuclear energy does not involve entirely new methods of power generation as did the steam engine; it is simply a new fuel and can be used only within the framework of present day power generating systems. Although there is a remote possibility that in the future some of the energy available within the atom may be released directly through a medium other than a heat engine, such a device is not at present known. The current work is concentrated on the problem of adapting present power producing techniques and equipment to this new type of fuel.

As matters stand, no element of a power plant can be omitted when nuclear energy is used to replace our present forms of fuel, although fuel handling equipment will be greatly reduced in size and may be omitted entirely in plants designed to operate for a limited time.

A great deal which has been written since Aug. 6, 1945, has created the general impression that the solution to the problem of power generation from nuclear energy was achieved when the bomb was successfully tested. This has no basis in fact. A bomb and a power pile are two vastly different problems.

The bomb was a "one-shot" device. The objective in bomb development was an explosion, and the consequent destruction of the bomb. A stationary power pile, on the other hand, must be designed to last for many years. It must be capable of starting and stopping quickly, and of being controlled continuously with precision, over a wide range. Furthermore, its design must incorporate features to prevent irradiation of personnel.

Difficulties Confronted

The designer of an atomic power pile has practically no data to guide him, so new is the field. He must feel his way without certainty of the correctness of his design until actual tests of the completed structure are conducted. Difficulties confronted in designing and constructing an atomic power plant can be broken down into four broad fields: (1) Materials of construction; (2) heat transfer medium; (3) auxiliary and operating equipment; (4) safety.

Concerning the first category, materials of construction, materials must be found which not only meet the requirements of present power production facilities, that is, possess strength, resistance to deformation and ability to withstand high temperature, but also have the additional quality of not breaking down under neutron bombardment. The metals used in a power pile must be capable of withstanding very high operating temperatures and considerable research and testing will be required to develop suitable metals.

A suitable moderator to slow the neutrons down to the desirable speed must be employed in some pile designs. Again, in addition to possessing the required neutron and moderating qualities, this material must be capable of operating continuously at high temperatures.

Second major field of difficulty which requires much research and investigation is the choice of a suitable heat transfer medium or pile coolant. The purpose of the coolant is to remove the heat generated by fission within the power pile and convey this heat energy to the power system. Theoretically, it is possible to use ordinary water, heavy water, gases, or liquids other than water. Several liquid metals are being studied, but little is known of their properties from a nuclear and corrosive standpoint.

Third broad field is the design and development of auxiliary and operating equipment such as pumps, blowers, valves and heat exchangers. Since these may become radioactive during operation of the pile, they must be so designated as to be trouble free and must require either no maintenance for extended periods of time, or maintenance by remote control apparatus which entails obvious difficulties. Further, because of the danger to the personnel, the pumps, blowers and valves must remain absolutely tight and prevent any leakage.

The protection of pile operators from radiation and radio activity and other fission products is the fourth broad field of difficulty confronting the designer of an atomic power plant. The radio activity emanating from a power pile is the equivalent of tons of radium. Much of this radio activity persists even after the pile is shut down. For protection against the radiation it is necessary to use materials that are effective in slowing down or stopping neutrons and in absorbing gamma rays. At Hanford, where plutonium production piles are located, massive shields are necessary. Thick shields are required even for piles producing a relatively small amount of power. At the present time this is a major difficulty retarding the development of small atomic power plants or nuclear reactors.

Insufficient Knowledge of New Fuel

In addition to these four factors, it is important to keep in mind that we do not at this time have sufficient knowledge or experience with nuclear fuels, to make any predictions as to the future economic position of nuclear fuels with relation to conventional fuels.

As an indicator of the all-important cost angle in connection with the development of nuclear power, the following is quoted from a recent report by Bernard M. Baruch, as United States representative on the United Nations Atomic Energy Commission. The report summarized results of a study made by members of the staff at Clinton Laboratories at Oak Ridge and the Monsanto Chemical Co. Engineering Department under the direction of Dr. Charles A. Thomas, vice president and director of the Monsanto Chemical Co.

"While no such plant (nuclear power plant) has ever been built, it is felt probable that a large stationary nuclear power plant could be built. Based on prices now current, a plant designed along

(*Please turn to Page* 98)

Engineering News *at a Glance*

"LOOPING HINGES": Forty-fold increase in die life, and elimination of practically all maintenance are reported to result by the use of carbide dies for forming loops on small hinges at the Bridgeport, Conn., plant of Underwood Corp., according to Carboloy Co. Inc., Detroit. The forming die is a simple bushing grade of 883 tungsten carbide. A slot, just wide enough to clear the thickness of the work piece is cut in the bushing. The hinge blanks, of cold rolled steel, are fed into the die from a press. This forms the loop on one end of the hinge, inside the die. Finished piece is ejected sideways out of the die, and the cycle repeated. One die, the latest production report reveals, turned out more than 1,000,000 looped hinges without exhibiting any detectable signs of wear that are detectable.

RAILROAD COMFORT: Revolutionary electronic temperature control system is to be specified for the 284 new passenger cars now being built for the Chesapeake & Ohio, Pere Marquette and Nickel Plate railroads, Robert R. Young, C & O board chairman, reported recently. In the system, thermostats are installed against the outside skin of the car. These "feel" the slightest changes in weather, even effects of shade and sun, and work in conjunction with other thermostats located inside the car to provide a closer control over flow of hot or cold air. Sensitive to one-tenth of a degree, the thermostats react instantaneously as opposed to present units which respond more slowly.

"FLYING EYE": Bomb-like "flying eye" developed by Gulf research for "looking" through water in detecting submarines during the war, will usher in a new era of oil exploration from the skies. It can "see" through the earth's crust to chart underground magnetic structure. As the first airborne prospecting device, it opens to oil exploration formerly inaccessible jungle, mountain and ocean regions; and will speed up discovery of the world's remaining oil resources. In use, the magnetic detector trails from a cable attached to the plane.

VANADIUM FROM SLAG: Germans, during the war, recovered an estimated 6,500,000 lb of vanadium per year from bessemer slag, according to the Office of Technical Services, Washington. Domestic and Swedish iron ores used by the Germans contain about 0.1 per cent vanadium. When iron from this ore is converted to steel, vanadium goes into the converter slag in a concentration of 1 per cent or more. If the slag is resmelted and the metal again passed through the converter, the vanadium concentrates in the slag to the extent of 10 per cent, enough to leach out by the sodium process. Although an expensive method, the Germans needed the vanadium for high-speed tools steel, and as a substitute for other scarce alloying metals, especially molybdenum.

ON THE SPOT ADVICE: A welding engineering service to provide engineers and production men of any organization a key to the design and production of low cost weldments was inaugurated recently by Lincoln Electric Co., Cleveland. According to the company, the service is flexible and can be worked into a plant schedule in any manner convenient. It is offering the services of R. H. Davies, consulting engineer, for 3 days or longer at a small cost. During that time he will point out to engineers fundamentals of welded design and review present designs for suggested changes or improvements.

MATCH PLATE PATTERNS: Recently perfected method of making match plate foundry patterns of liquid phenolic resin developed by Atlas Plastics Inc., Buffalo, not only serves to protect edges and corners of the cast resin but also adds further reinforcement, and increases the tensile strength of the pattern as a whole. According to *The Foundry*, the method involves use of a simple channeled metal frame which is placed in the form into which the casting resin is poured, literally becoming an integral part of the plate. This results in a pattern that gives excellent service. In an original production run, such a pattern was used in a jolt-squeeze machine at 80 lb pressure without showing any ill effects. Almost any conceivable shape is readily produced in the resin. The slightest detail in the original mold is faithfully reproduced in each piece.

TORCH SHORTENING: Pins and pinholes in the eyebars of many pin-connected truss bridges are subject to a high rate of wear resulting from operation of heavy locomotives at high speeds. In some spans, the bars become so loosened through wear that they carry little, if any, of the total stress in the member. They also are known to rattle for several minutes after the passing of a train. Various costly methods were employed by railroads in an effort to tighten the loose eyebars. Lately, to eliminate train delays, they resorted to heating the eyebars with an oxyacetylene torch to a cherry red, then upsetting the heated part by a special clamp. Choice of this method was substantiated recently by an investigation made by a committee of the Welding Research Council, a project of the Engineering Foundation, New York, which found that shortening of bars by heating with an oxyacetylene torch does not materially affect the fatigue strength of the bars. Association of American Railroads estimates that if the method were used to tighten all loose eyebars, resulting saving would be about $1 million per year.

"SPHERICAL GRAPHITE": British research workers discovered recently methods of producing iron in the as-cast condition in which graphite appears in nodular or spherical form instead of the elongated flakes found normally. According to Dr. Harold Hartley, president, British Cast Iron Research Association, possibilities of this development, if fully utilized, may alter the whole cast iron industry. As-cast materials are said to possess properties of the best types of high-duty cast iron, and are obtained without the use of special compositions or treatments previously required. Striking feature of the material is its uniformity from piece to piece. The development is said to be readily applicable to medium and high carbon steels.

USES SPHERED BEARINGS: Novel application of antifriction bearings to the sphered crankshafts of the 5000-hp XR-7755, Army's huge reciprocating aircraft engine, was revealed recently by SKF Industries Inc., Philadelphia. The installation is said to mark the first use of these bearings in engines of such large proportions. Bearings of the XR-7755, STEEL, p. 114, Dec. 2, 1946, are cylindrical roller types, bores of which are sphered to fit the engine's crankshaft, the latter a design entirely new in the aviation field. One foot in diameter, and slightly more than 1 in. wide, each bearing weighs less than 15 lb. Designed to withstand normal loads of 15,000 lb the bearings are so adaptable that they can take instantaneous peak loads of about 100,000 lb. Mounting of the bearings on the crankshaft's sphered seat eliminates the need for locking devices to hold them in position. They also serve to separate the liquid-cooled engines four banks of nine cylinders.

Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

SEA-AIR-EARTH: I have just spent an interesting five days attending the annual meeting of the Society of Automotive Engineers in Detroit. In case you are not aware of it, consideration of internal combustion engine driven automobiles is today only one of the many phases of that great Society's engineering activities.

Today the well-known initials SAE might well stand for "Sea-Air-Earth" as indicative of the scope of the organization's activities. That is true especially now that SAE finally has gotten around to elect a tractor man president, in the person of Conrad E. Frudden, consulting engineer, Tractor Division, Allis-Chalmers Mfg. Co., Milwaukee.

It is indeed a far cry from the old ALAM, which was concerned only with "horseless carriages driven by gasoline engines," to the present SAE which is concerned with everything predicted by Mother Shipton, and also many things that she failed to predict—including jet propelled aircraft.

This jet propulsion business has gone ahead much faster and much further than generally is realized. Not only did I find engine manufacturers considering turbo-jet and rocket motor designs, but also I found production men actively working on manufacturing problems involved and parts manufacturers actively and optimistically planning for new lines of parts and accessories for the new types of motors.

Instead of resorting to the Wailing Wall because something radically new threatens their old, established lines, these manufacturers are following the fine American tradition of making new and better jobs for more people—making new things.

MATERIALS ON THE MOVE: During the SAE meeting in Detroit, I was invited to a little "get-together" with George T. Christopher, president and general manager, Packard Motor Car Co. This was not my first session with Mr. Christopher, therefore, I knew that it would be very much worthwhile.

As a practical man who worked his way up through shop and engineering departments, Mr. Christopher hammered home two facts. One is that work in a modern, well-equipped shop no longer is anything like the "hard work" that it used to be. The other is that no day in the shop is any longer and more unsatisfactory to the worker than that day when "time has to be killed" because of interruptions in the steady flow of material to and from the department. That session put me in the mood fully to appreciate the significance of the Materials Handling Exhibition in Cleveland the following week.

When I worked in the shop, there was a "flow chart" which showed the theoretical progress of various machine tool components from receiving platform to shipping dock. However, the material didn't flow. It was pushed, pulled, heaved, boosted and otherwise "horsed around" by some who made that strong-arm stuff their sole business and by all the rest of us who perforce made it our part-time job.

We did have an outside traveling crane, some high wheeled hand trucks and two-wheeled trucks, a few chain falls, jack screws, pinchbars, rollers, blocks and tackle, and innumerable metal tote boxes which we dragged around with hooks. The nearest thing to a stacking machine was a fixed hydraulic elevator in the stockroom and another to the small casting storage in the basement. Archimedes and his lever would have been a handyman around that shop—or in almost any shop of that time.

One of the big lessons that I learned at the Materials Handling Exhibition is that today there is no excuse for any machine operator either spending his high priced time "horsing" anything in and out of his machine, or in awaiting its delivery to his machine. It can be done mechanically—and in most cases by power driven equipment—quicker and better and more safely—than any unaided human being can do it.

Even though a shop is old, its aisles and doorways narrow and overhead obstructed, it still can be done mechanically. Modern equipment goes through any ordinary doorway, "turns in its tracks," and lifts right from the floor without straining itself or anybody's back. It is a "must" to insure profits and good public relations.

TEN GREAT INVENTIONS: This is the title of a 32-page booklet just released by the National Machine Tool Builders' Association, in the interest of better public understanding of the fact that in relieving the human race of drudgery, machines have not robbed the human race of its livelihood.

The ten great inventions dealt with are: The power loom by Dr. Edmund Cartwright; the sewing machine by Elias Howe Jr.; interchangeable manufacturing by Eli Whitney; the self-acting lathe by Thomas Blanchard; the steamboat by Robert Fulton; the locomotive by George Stephenson; the coal cutter by Francis Lechner; the typewriter by Christopher Sholes; the linotype by Ottmar Mergenthaler; and the continuous sheet mill by John Titus.

The text brings out that every one of these inventions met with resistance on the part of those who mistook relief from drudgery for a sentence to starvation. It also brings out by facts and figures the tremendous number of new and better jobs which these inventions actually did create, and the wealth which they have added.

All this is neatly summed up in the following quotation from Henry Ward Beecher: "A tool is but the extension of a man's hand, and a machine is but a complex tool. And he that invents a machine augments the power of man and the well-being of mankind."

Henry Ward Beecher was a firm believer in the American way of life. He preached its advantages to some extremely hostile groups—and eventually won them over by the power of his logic. This booklet should be an inspiration to a lot of others to do likewise. There are a lot of people today who are sadly in need of the truth about mechanization.

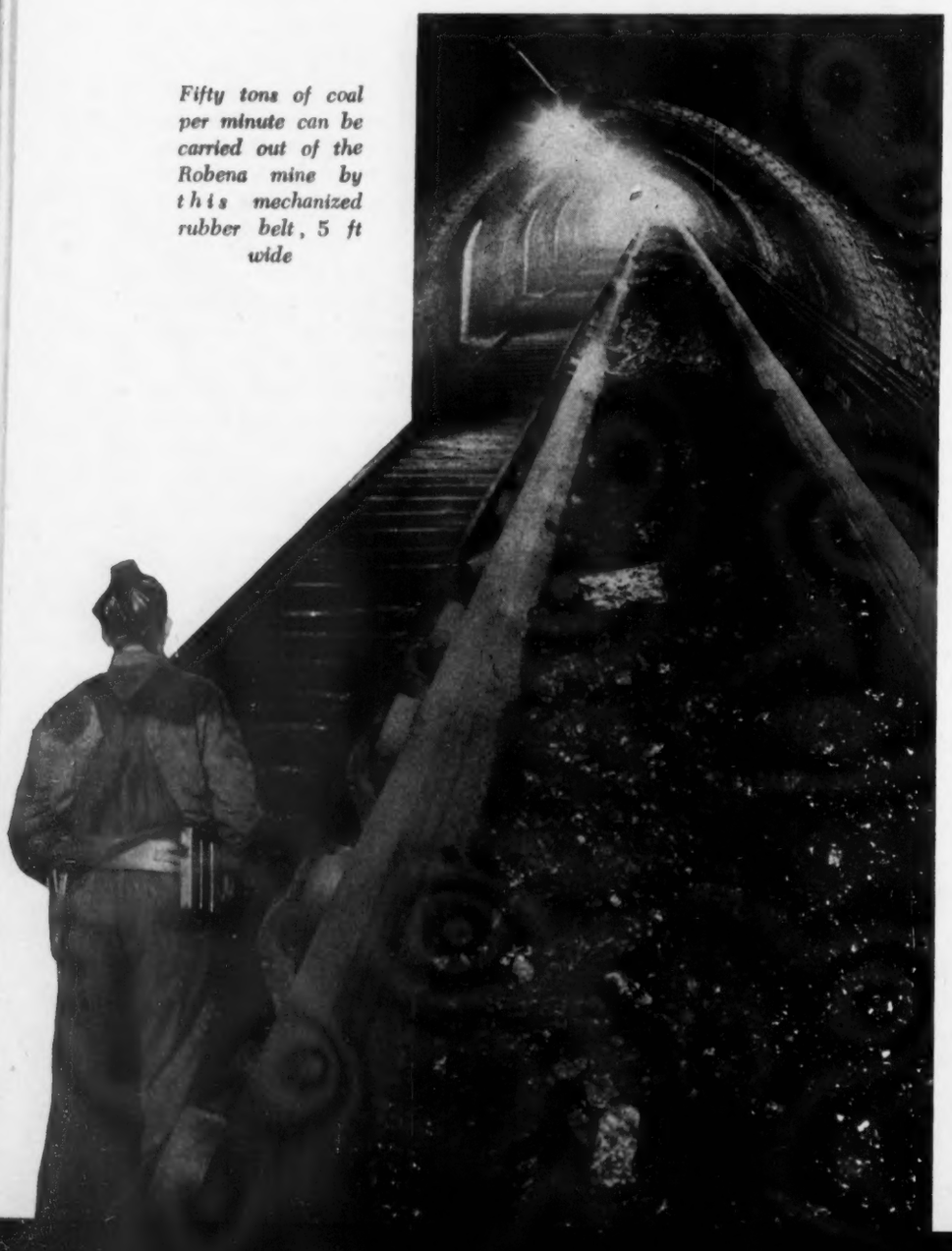
Coal Washing

By W. L. McMORRIS, JR.
Preparation and Research Engineer
H. C. Frick Coke Co.
Pittsburgh

Spiral concentrator and preclassified table feed now are being given their initial use in the field of fine coal cleaning. Solid bowl centrifugal filter is being employed for the first time for drying wet cleaned fine coal. Preview of Robena mine is presented

DURING the war years, metallurgical coal producers have been squeezed between accelerated exhaustion of higher grade coals and the necessay expansion of mechanized mining to bolster up depleted manpower resources. By the use of modern methods of beneficiation, however, substantial improvement in the quality of coal for present seams is entirely practical, and acceptable fuels can be prepared from even poorer grade seams.

There are today a number of new tools for the preparation of coal. For cleaning of coarse sizes of coal, true gravity separation processes are receiving considerable attention. Basically there are two general sink and float methods by which a separation can be made at a predetermined specific gravity. First is the use of a liquid having a specific gravity equal to that of the desired separating gravity. The second method is the use of heavy media which consists of a slurry of water with fine mesh heavy minerals such as sand, magnetite, galena, or others. Much attention is being given to the cleaning of coal finer than ⅜-in. Most commercial processes are based on the principles of hindered settling or that in combination wth free settling.



Fifty tons of coal per minute can be carried out of the Robena mine by this mechanized rubber belt, 5 ft wide

Among the new comers to the fine coal cleaning field is the spiral concentrator. Froth flotation of fine mesh coal has been tested by a number of companies. Electrostatic cleaning of predried coal fines in the size range from 8 to 10 mesh down to 100 mesh has proved successful from the standpoint of actual separation. Coal washing tables are used in the anthracite field and in Alabama on metallurgical coal. Application of a preclassified table feed is new to coal cleaning. For the drying of wet cleaned fine coal, the use of a solid bowl centrifugal filter is offered as an interesting innovation.

The blending section of the Robena is nearing completion, while the cleaning plant is just emerging from the paper stage with some equipment on order and the foundation plans about ready. This mine will produce a coal much higher in sulphur than that from any other of the H. C. Frick Coke Co. properties. Extensive diamond drilling, followed by heading samples, affords a fairly accurate picture of sulphur distribution.

Each gathering point for mine cars will be classified as to a high or low sulphur section in accordance with its contribution to the average. The loaded trips will be dropped on one of two tracks, one reserved for high-sulphur coal, the other for lower-sulphur coal. These feed to separate dumpers discharging simultaneously into a common hopper which supplies a 60-in. belt. This in turn delivers the coal to a screening, picking, and crushing building, from which the coal goes to the 18,000-ton blending bin.

The bin distribution system consists of a tripper belt discharging to a cross shuttle, which fills the cells making up the pockets. Each of the three rows of 14 pockets holds 6000 tons of coal. Belt feeders under the bin will have variable-speed control and the 14 feeders are subject to a gang control to vary the total output as required.

Test work has indicated the desira-

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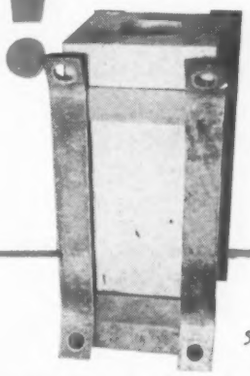

The graphite mold in which 538 ingots were cast

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bility of a 2-gravity separation discarding high ash and high sulphur refuse in the first stage and producing a low gravity clean coal in the second stage. The natural ¼-in. slack will require precise cleaning to eliminate the fine mesh pyrite which is present. The plant as designed is flexible and it is hoped that it will produce a uniform grade of coal at whatever final gravity is agreed upon. Embodied in the plant will be heavy media cones using magnetite as the medium for the coarse sizes, followed by classification and tabling of the sizes below ¼-in. Coal will be dewatered in solid bowl centrifugal filters.

Coal, 3 x 0 in., will be discharged by weighing feeders over vibrating screens where the natural minus ¼-in. coal will be screened out. Oversize from the prewetting screens discharges to the primary cone for initial high-gravity separation. Float, together with medium, will be discharged to screens through which the medium drains, the oversize discharging to the secondary cone for low-gravity separation. Float from this will be washed and dewatered over ¼-in. bottom size screens. Dewatered coal moves to the river tipple.

The fine coal plant starts at the ¼ x 0 surge bins. From these bins the coal will be delivered over scales to four spigot classifiers. Overflow of these is delivered to settling tanks. Clean coal product of the coarse size tables and the extreme fine tables is mixed and becomes the feed for a battery of centrifugal driers, discharging to the final clean coal belt.

Raw coal, heavy media cleaned coal, heavy media refuse, table cleaned fine mesh coal and table refuse will be weighed and sampled to provide accurate information as to the performance of this plant.

Magnetite washed off the coal is delivered to medium thickeners. Before entering these thickeners, the magnetite and water and fine mesh coal or refuse, pass through magnetizing blocks which cause the magnetite to flocculate and settle rapidly in the small thickeners. The overflow of these thickeners containing magnetite and some of the coarsest of the coal degradation is delivered to primary separators where the magnetite is freed from the coal and delivered to spiral classifiers for densifying or dewatering. The product of these densifiers passes through demagnetizing coils to break up any tendency for the magnetite particles to cling to each other on return to the cone circuits. The magnetite used will be 85 to 90 per cent minus 325 mesh and when demagnetized will maintain a stable gravity slurry. New magnetite will be ground in a ball mill in closed circuit with a classifier, the overflow of which will carry magnetite sufficiently fine for use in the plant. This new magnetite is to be divided between the two medium thickeners,

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From a paper presented before the Blast Furnace and Raw Materials conference, AIME, Chicago, April 24-26, 1946.

Atomic Power Plant

(*Concluded from Page* 93)

the lines indicated and producing 75,000 kilowatts could be built in a normal locality in the eastern United States for approximately $25,000,000. On the assumption that the plant would operate at 100 per cent of capacity and that interest charges on the investment would be 3 per cent, the operating cost of the plant would be approximately 0.8-cent per kilowatt hour.

"This is to be compared with coal power plants which would cost $10,000,000 under the same conditions. The operating cost depends on the price of coal. The price of bituminous coal of 13,500 Btu is about $3.50 per ton at the mine and about $7.00 per ton delivered to the furnaces of a power plant in the eastern United States. The operating cost of such a power plant would be approximately 0.65-cent per kilowatt hour, again on assumption that the plant would operate at 100 per cent of capacity and that the interest charges on the investment would be 3 per cent. Equality of operating costs between coal power plants and nuclear power plants would be reached if the coal cost $10 per ton. It must be realized that lower costs of nuclear power plants can best be achieved by continued research and development.

"It should be emphasized that these costs imply the successful solution of a number of difficult technological problems.

"In the case of nuclear power, the operating cost is greatly affected by the large investment, which is reflected in the interest, depreciation and maintenance charges. The labor and supervision charges for the nuclear plant are expected to be greater than for the coal plant, until such time as the production of electrical power from nuclear energy has been further developed. It seems reasonable to expect that the future development of nuclear power will result in the standardization of design and construction, and a material reduction in the investment as well as the operating cost.

"The cost of power from coal is primarily determined by the price of coal, which constitutes about 55 per cent of the total operating cost. The prices of coal and fuel oil have increased greatly since before the war and show signs of increasing further in the future. The coal plant figures are based on high quality coal as delivered to plants in the eastern part of the United States during the second half of 1946. It would appear that the cost of nuclear power may decrease and the cost of coal power may increase as time goes by, and that the development of nuclear power may prove to be attractive to those industries which are capable of undertaking the development.

"Nuclear power plants would make feasible a greater decentralization of industry, a desirable factor in the world economy. Only a trivial amount of fuel need be brought in, and the need for a large cooling water supply might be obviated by the development of gas turbines.

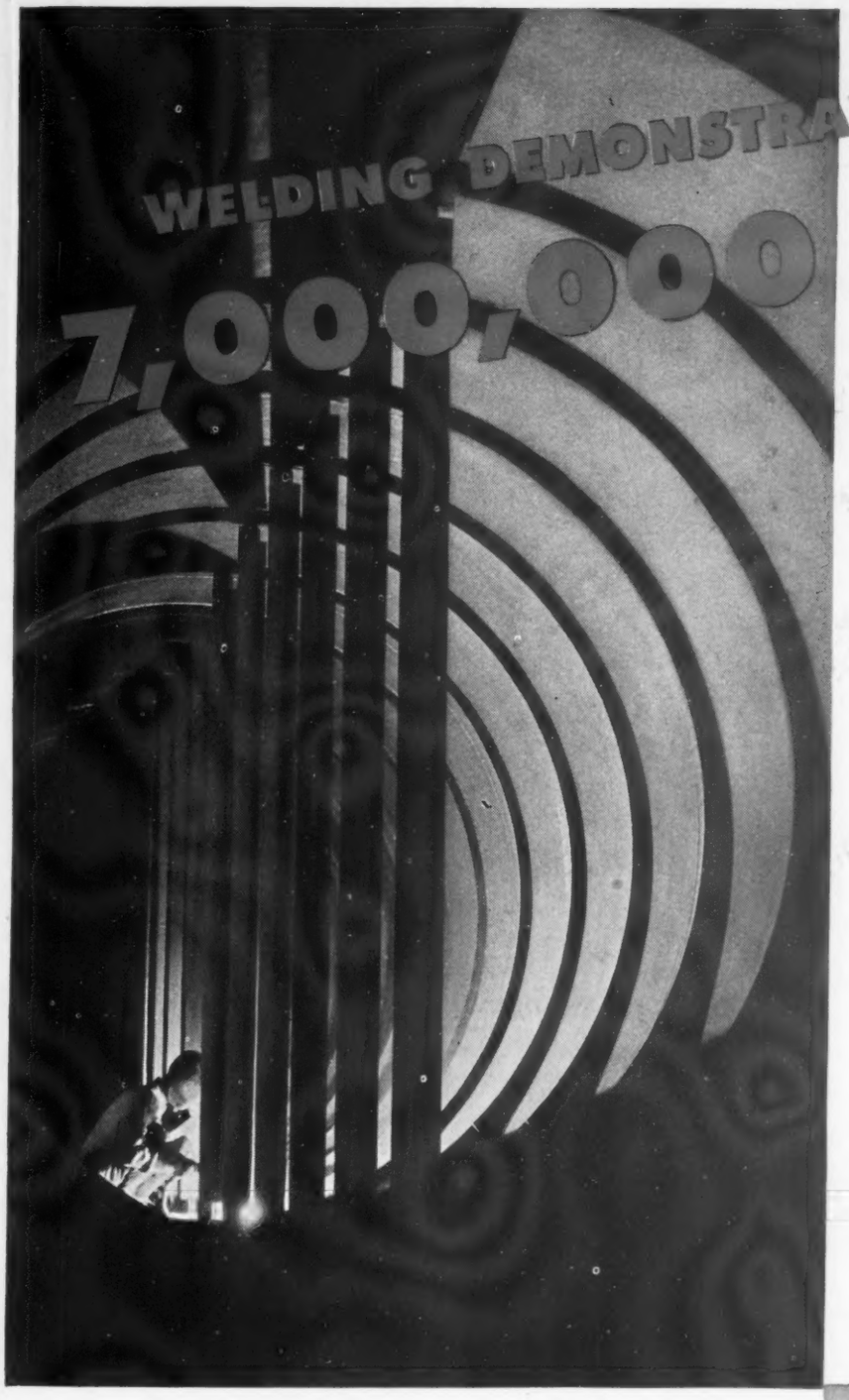
"Nuclear power plants in contradistinction to hydroelectric power plants have the advantage of being able to supply process and heating steam directly in addition to power. Because nuclear plants lend themselves to decentralization, more economical industrial combinations should develop.

"Research has already shown possibilities for use of radioactive isotopes in analytical work and medical treatment. These isotopes would be valuable by-products from the production of power, although they would probably have little effect on the economics of power generation.

"The nuclear power plant might aid in the industrial development of isolated parts of the world where the cost of oil, gas or coal is prohibitive and where a suitable water supply is unavailable, because the nuclear power plant, if combined with the modern gas turbine, would make unnecessary a supply of any such fuels as cooling water. The nuclear power plant, in connection with the modern gas turbine, might be desirable as operating or standby plants to existing large utilities.

"On the basis of this study, and other similar studies which have been made recently, it seems probable that nuclear power will find favorable industrial application if obstacles are not placed in the path of its development.

"It is not altogether a case of nuclear power versus coal, oil or water power, because the nuclear power plant has advantages and fields of application not open to other types of power producing plants."



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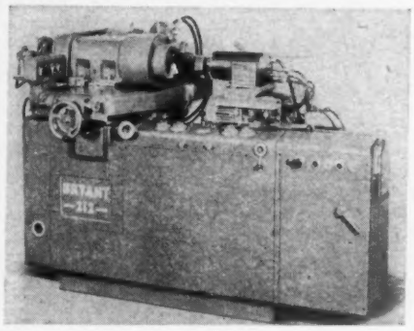


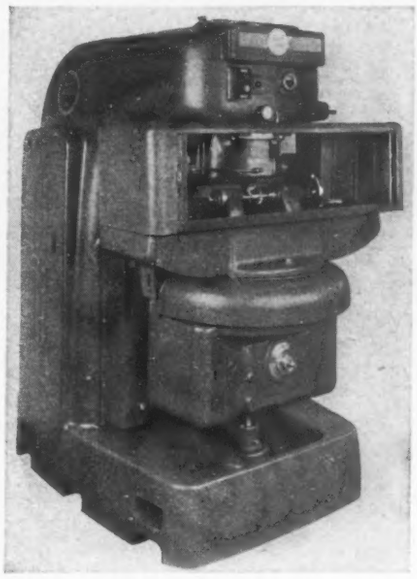
Internal Grinder

Designed so one operator can operate more than one unit, the No. 212 automatic internal grinder, shown above, built by Bryant Chucking Grinder Co., Springfield, Vt., is a precision, high production machine. Rigidity is provided by cylindrical slide construction. Slide bar, to which the wheelslide is attached, is supported on two bearings in base of the machine. Grinder has a 9 in. swing inside the standard water guard and a 12 in. total wheelslide traverse. Cross feed is obtained by lateral motion of antifriction roller bearing supported workhead. Grinding of bores from 5/16 to 3½-in. diameter and up to 3 in. length is possible, with spindle speeds up to 100,000 rpm. Machine movements are controlled hydraulically; and cycle control is electric.
Steel 1/27/47; *Item No.* 9119

Gear Shaver

The Red Ring diagonal gear shaving machine, center above, developed by National Broach & Machine Co., Detroit, utilizes a new principle involving the feeding of the work gear across the cutter. Work is fed at an angle to its axis, the angle being selected with reference to dimensional and physical characteristics of gear being shaved. Method makes it practicable to remove more stock per cycle in less cutting time.

Entire cutting cycle of the machine is composed of two passes through the cutter. With diagonal traverse there is no restriction on face width of cutter. Other advantages are better control of lead on helical gears, less danger of cutter breakage with processing shoulder gears and less trouble with tapered tooth condition on such gears. With center distance constant and rate of feed set, operator is powerless to jeopardize shaving cutter and tooth surface smoothness by excessive rates of feed. Loading and unloading time is reduced by a quick-loading tailstock.
Steel 1/27/47; *Item No.* 9122

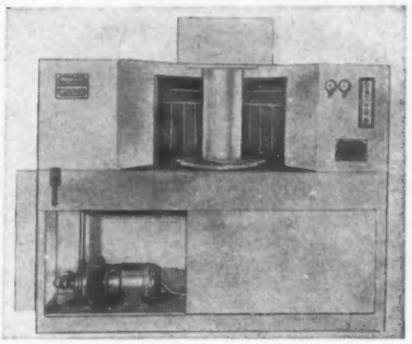


Power Drive

Variable speed power drive designed to meet any fractional horsepower drive requirement is announced by Flinchbaugh Co., 750 South Court street, York, Pa. Called the Men-E-Uses it has a range of from 20 to 750 rpm with 1725 rpm motors. This can be further lowered to 4 rpm with an additional auxiliary shaft. With base and housing of aluminum, it weighs 12 lb. Height of the unit, shown left below, is adjustable—depending on length of posts used. A universal mounting for motors of ½-hp and under is provided. Shaft rotation can be secured by mounting motor right or left on base.
Steel 1/27/47; *Item No.* 9120

Washing, Drying Machine

A turn-table type washer that both rinses and dries average size parts in baskets, trays or individually is announced by Mabor Co., Clark Township, Rahway, N. J. Unit, shown right above, is completely self-contained and requires only one operator to load and unload parts. It operates at the average rate of 60 baskets per hour. Various basket dimensions, 12 x 12 in., 16 x 16 in., and 20 x 20 in., with load capacities of 1800, 2500 and 3000 lb, are available. All three models of the machine may be heated by steam, gas, oil or electricity.
Steel 1/27/47; *Item No.* 9121



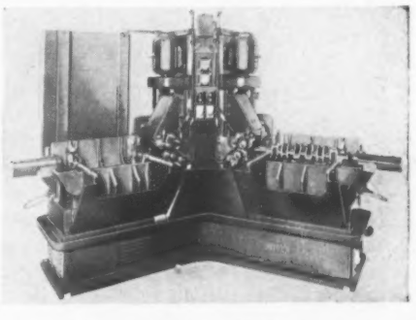
Extension Flashlight

A powerful beam of shadowless light can be introduced into inaccessible areas with the Flex-Lite extension flashlight produced by Aero-Motive Mfg. Co., 1803 Alcott street, Kalamazoo 24, Mich. Each of the three models manufactured has a long flexible extension bulb-retainer which replaces the conventional bulb assembly.

Made of polished aluminum, the flashlights can be immersed in water without shorting. Junior model with screw type switch in base and Junior Deluxe model with pocket clip and thumb type sliding switch have overall lengths of 15 in. and use two standard size AA penlite batteries. The Master model, 16½ in. overall, uses two regular size flashlight batteries and has thumb type switch.
Steel 1/27/47; *Item No.* 9995

Keyway Cutter

Operating economies and reduction in floor space are features of the special dual automatic keyway cutter designed by Snyder Tool & Engineering Co., Detroit. At each station, two keyways are cut in a large crankshaft. Work parts are clamped hydraulically and loading and



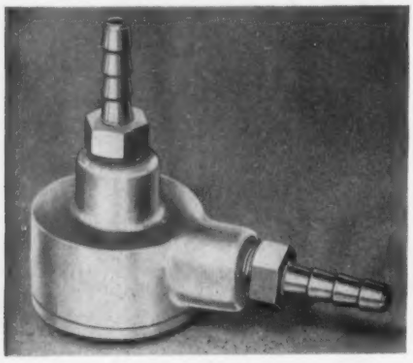
(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 104.)

unloading is performed at one station while the other is in operation.

Push button control activates the automatic cycle. Spindle slides have rapid advance and return, and hydraulic feeds are readily adjustable. Fixture is automatically indexed away from the cutters to assure easy loading and unloading, and safety limit switches prevent operating machine before part is safety clamped. Spindles are worm-gear driven and drive high speed steel cutters with integral shank. Cutting speed is approximately 40 fpm.
Steel 1/27/47; *Item No.* 9989

Exhaust Valve

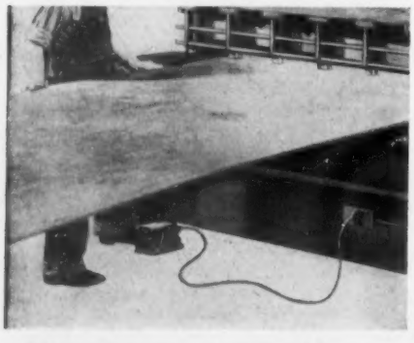
Mead Specialties Co., 4114 North Knox avenue, Chicago, announces a quick exhaust valve for use with pneumatic cylin-



ders. Acting on the principle of a bellows, it expels air quickly, to increase production. Unit automatically opens as soon as the air supply is shut off, thus speeding up return stroke of air cylinder. It can be attached directly to air cylinders with a ¼-in. pipe nipple, or cut into air hose adjacent to cylinder.
Steel 1/27/47; *Item No.* 9946

Shear Control

Control of Steelweld shears built by Cleveland Crane & Engineering Co., Wickliffe, O., has been made easy and



convenient by an electric foot control that has been adopted as a standard feature on all size machines. Switch, connected to an outlet at front of the machine by a heavy cable, controls the movement of the blade. It can be slid around the floor to the most convenient position for use.

Switch requires only a slight movement of the toe. Control is especially advantageous when cutting long sheets necessitating the operator to stand several feet from front of the machine.
Steel 1/27/47; *Item No.* 9981

Breathing Apparatus

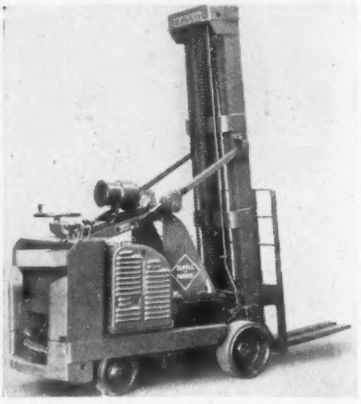
The Air-Pad, a versatile new type self-contained breathing apparatus, manufactured by Scott Aviation Corp., Lancaster, N. Y., enables persons to safely

enter a smoke filled area or an area with air contaminated by ammonia or other obnoxious or deadly fumes. It also can be used as underwater breathing equipment for marine rescue, salvage, or repair work. The apparatus is approved by the Bureau of Mines.
Steel 1/27/47; *Item No.* 9920

Industrial Lift Truck

An elevating reach of 18 ft above floor level is attained by fork-type power industrial truck announced by Elwell-Parker Electric Co., Cleveland. Designated as model F 24 T, truck picks up loads on its bare fork or on pallets in the same manner as with standard models. Its capacity is rated at 4000 lb for lifting to a height of 11 ft, and 3000 lb to 18 ft. Truck is electrically driven, with three separate motors; one for traveling, one for operating the elevating mechanism, and the third for titling the upright columns. Tilting limit is 15° backward and 5° forward from vertical.

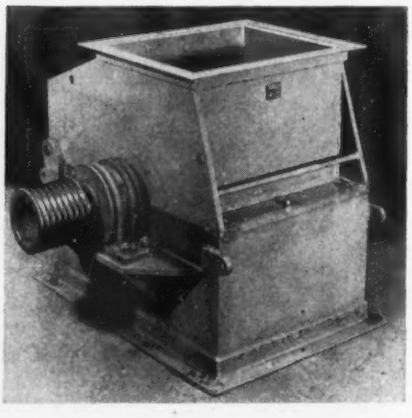
Controls are arranged on panel at a height convenient to average-size operator. Power switch is actuated by foot pedal. End-control affords the operator maximum safety. It also has an advantage over center control in that operator can watch load from a greater angle and is in better position to protect himself in case



the load should shift. Truck is mounted on four wheels and is driven by means of the forward pair.
Steel 1/27/47; *Item No.* 9925

Hammer Mill

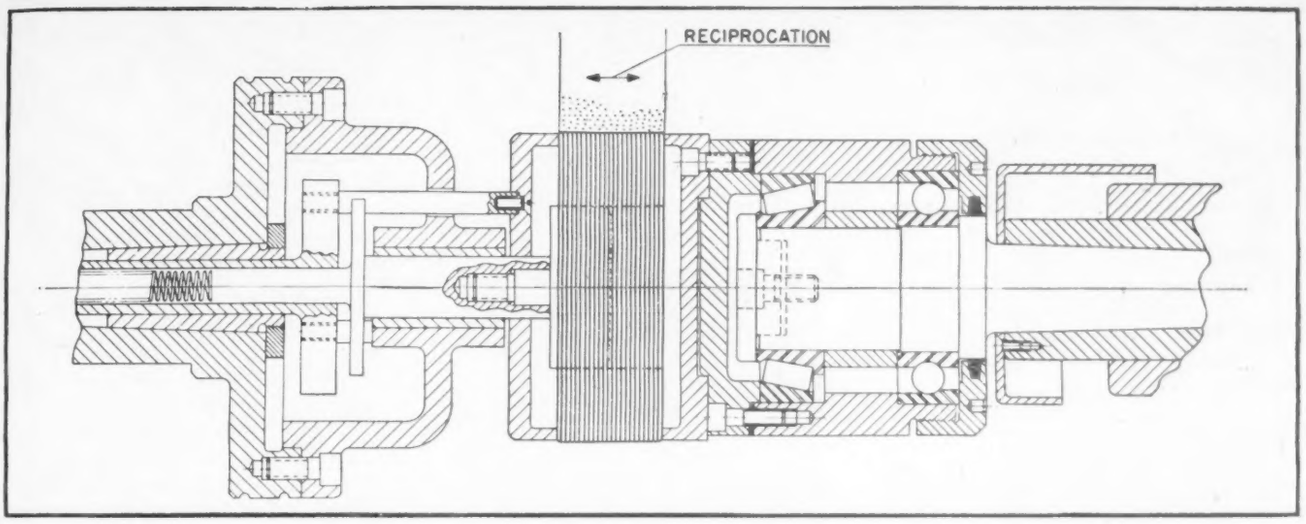
Material is hit while suspended in mid air to eliminate generating heat from friction of crushing actions in the new hammer mill announced by Buffalo Hammer Mill Corp., Buffalo 3. The unit, which has an overall height of 47 in., base 53 x 38 in. and a charge opening 24 x 30 in, can be used for grinding, pulverizing, crushing, shredding, defiberizing and hashing various materials. It breaks up all sizes of material by shat-



tering blows of several batteries of revolving hardened steel hammers at 1000 to 7500 rpm.

Material is discharged two ways, by gravity from bottom of machine or by conveying pneumatically to a collection system. Steel plate welded construction enables special as well as standard models to meet all applications. Mills are available from ½ to 200 hp and

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 104.)



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Grinding the O.D. (4.375 ± .002") of Laminated Stator Cores

THE WORK:

Two FITCHBURG 6" x 24" Bowgage Plunge-Cut Grinders, Center Type, are being used in the plant of a motor manufacturer to grind the outside diameters of stator cores. The cores consist of punchings riveted together, the inside diameter being previously ground on another machine.

As shown above, centering is accomplished by sliding the core onto a spring-loaded centering plug. The headstock holding and driving fixture is a hydraulic type which equalizes the holding pressure and maintains the core in the correct grinding position relative to the wheel.

The ball-bearing tailstock center is attached to a hydraulic footstock. Adapters grip the punchings almost to the outside edge to prevent flaring of the punchings during the grinding operation.

WHAT THE OPERATOR DOES:

1. Slides the core onto the centering plug.
2. Throws over a hydraulic footstock hand valve. (This advances the tailstock center and causes the adapters to grip the punchings.)
3. **Pushes the "START" button** and turns to a *second* similar machine.

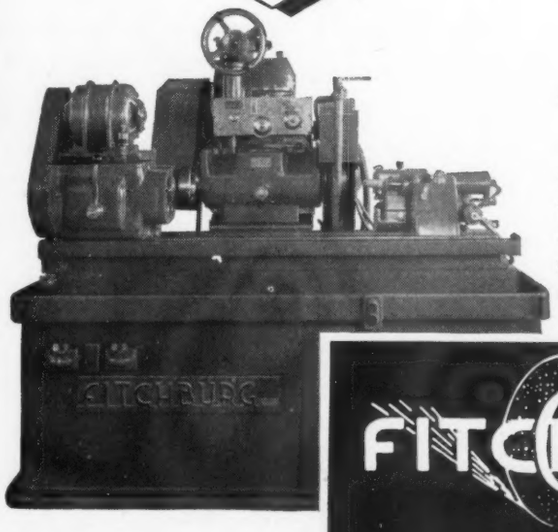
WHAT HAPPENS AT THE PUSH OF A BUTTON:

1. The work *automatically* starts revolving.
2. The Bowgage Wheelhead Unit *automatically* goes through its complete cycle:
   a. Wheel rapidly traverses to the work.
   b. Grinding feed diminishes as final size is reached.
   c. Wheel reciprocates ⅛" during entire cycle.
   d. Wheel rapidly returns to starting position.
   e. Wheelhead controls reset themselves *automatically* for the next complete cycle.
3. As the wheel draws away, the work *automatically* stops rotating. (Throwing the hydraulic footstock hand valve draws the tailstock away from the work, allowing the work to be removed and the next piece slid onto the centering plug.)

ONE OPERATOR CAN EASILY RUN 2 GRINDERS.

THIS PRODUCTION IS ON A 25 SECOND CYCLE, PER MACHINE — OR 300 PER MAN-HOUR.

If it's round ... and to be ground ... in mass-production quantities ... at a low cost per piece ... investigate FITCHBURG'S "PUSH-BUTTON" GRINDING.



FITCHBURG GRINDING MACHINE CORP.

FITCHBURG, MASSACHUSETTS, U.S.A.

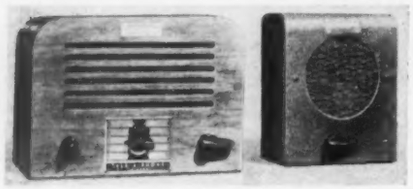
Manufacturers of — Bowgage Wheelhead Units, Multiple Precision Grinding Units, Spline Grinders, Cylindrical Grinders, Gear Grinders, Bath Full Universal Grinders and Special Purpose Grinders.

speeds of 1000 to 7500 rmp capacities. *Steel* 1/27/47; *Item No.* 9943

Communication System

Features such as Alnico No. 5 speakers, Insta-Action selector switch, and a powerful high-gain amplifier that delivers maximum output of power are included in the new special de luxe line of intercommunication systems manufactured by Talk-A-Phone Co., Chicago.

Illustrated is master station and substation in the KR-4010 series, which

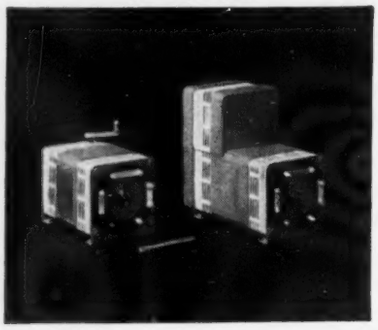


consists of one master station working with up to a total of 10 substations. Master stations can call any one or all substations at will and receive an answer. Substations may be installed in any remote spot up to 2500 ft from master station, regardless whether power supply is available there or not. Master station operates on 110-115v ac or dc. *Steel* 1/27/47; *Item No.* 9921

Voltage Regulators

Announcement of an extended line of dry-type induction voltage regulators to include 300 and 600-amp ratings is made by Transformer Division of General Electric Co., Schenectady, N. Y. Inductrols are available in two designs: Hand or motor-operated for providing a variable output voltage from a relatively constant supply voltage; and automatic (illustrated) for maintaining closely regulated output voltage from a varying supply voltage.

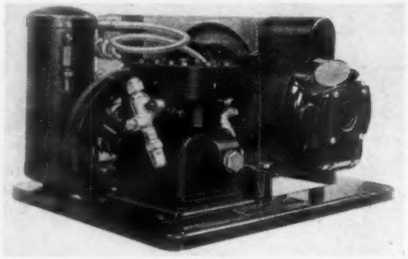
Manual control, automatic operation, or "test" can be selected by means of a switch on unit. When the selector switch is on "test" position, regulated voltage can be raised or lowered manually by small increments until either



limit of voltmeter band is reached, at which point voltmeter automatically takes over control and brings voltage back to center of voltmeter band. *Steel* 1/27/47; *Item No.* 9669

Condensing Unit

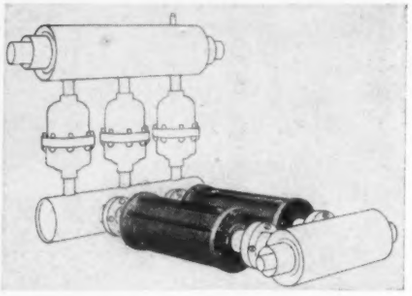
New open type condensing units, for use on a wide variety of refrigeration equipment, have been added to line of products Jack & Heintz Precision Indus-



tries Inc., Cleveland, is developing for the refrigeration field. Regarding the open type condensing units, which are to be produced in 1/4 and 1/3 hp models, the company pointed out that undivided responsibility of one manufacturer on such components as motors and compressors is expected to simplify service problems on equipment and to expedite a more rapid production schedule. *Steel* 1/27/47; *Item No.* 9894

Air, Gas Heater

Goodyer Industries Inc., 224 South Michigan avenue, Chicago 4, announces development of a unit called the Aridizer for heating both air and gases, as well as for superheating steam. Temperatures up to 1000° F can be maintained by the unit, with control of leaving tem-



peratures held to within plus or minus 1° F.

Adaptable for use in rubber, chemical and petroleum industries, the heating of compressed air for drying and dehydrating is made possible by the bilateral fin design of the unit. The effect of drying and dehydrating by compressed air permits full control to any degree of moisture contents of the products being processed. By this method, temperature of compressed air for a dehydrating process can be considerably lower than if the dehydrating were done by a conventional space

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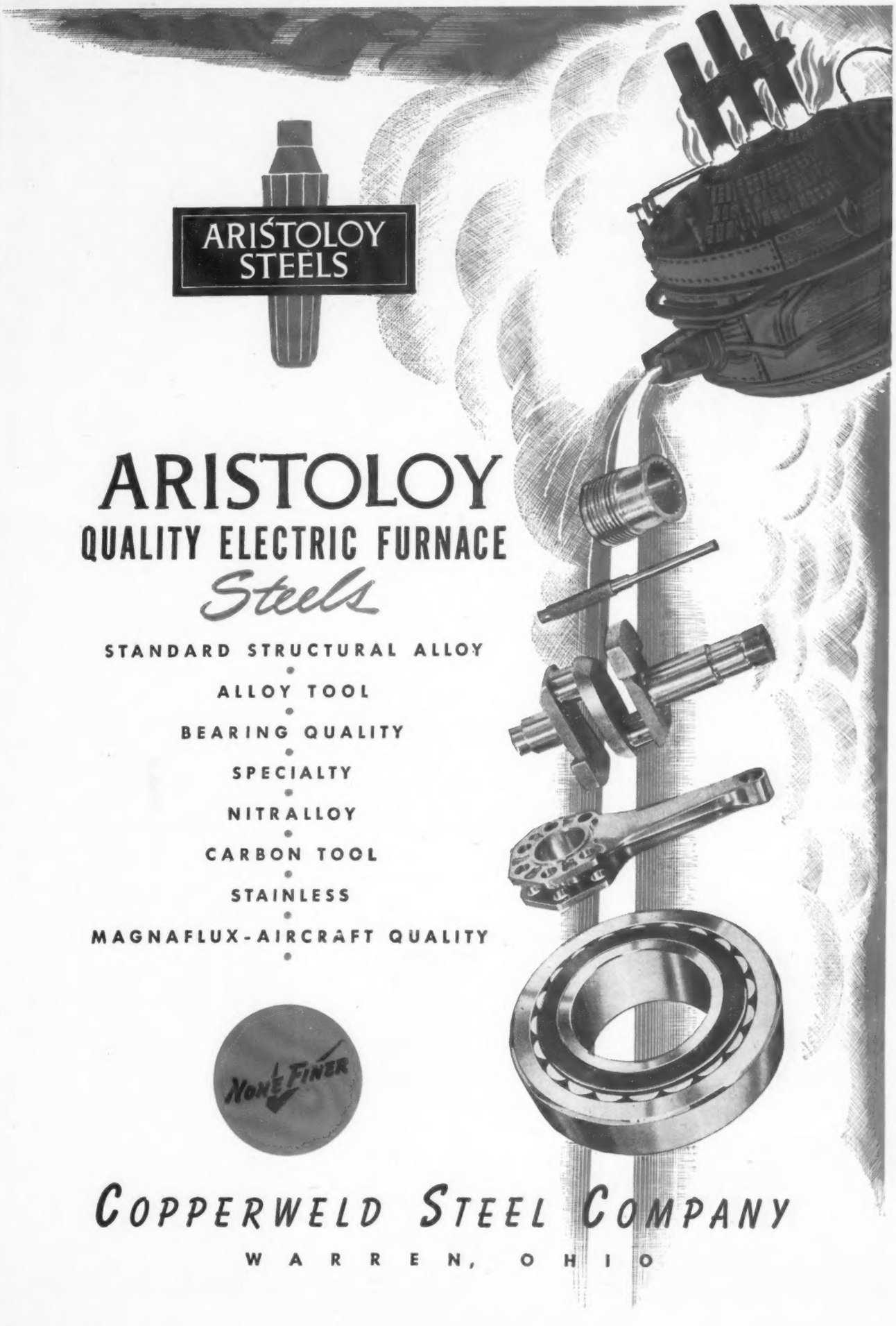

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Copperweld Steel Company

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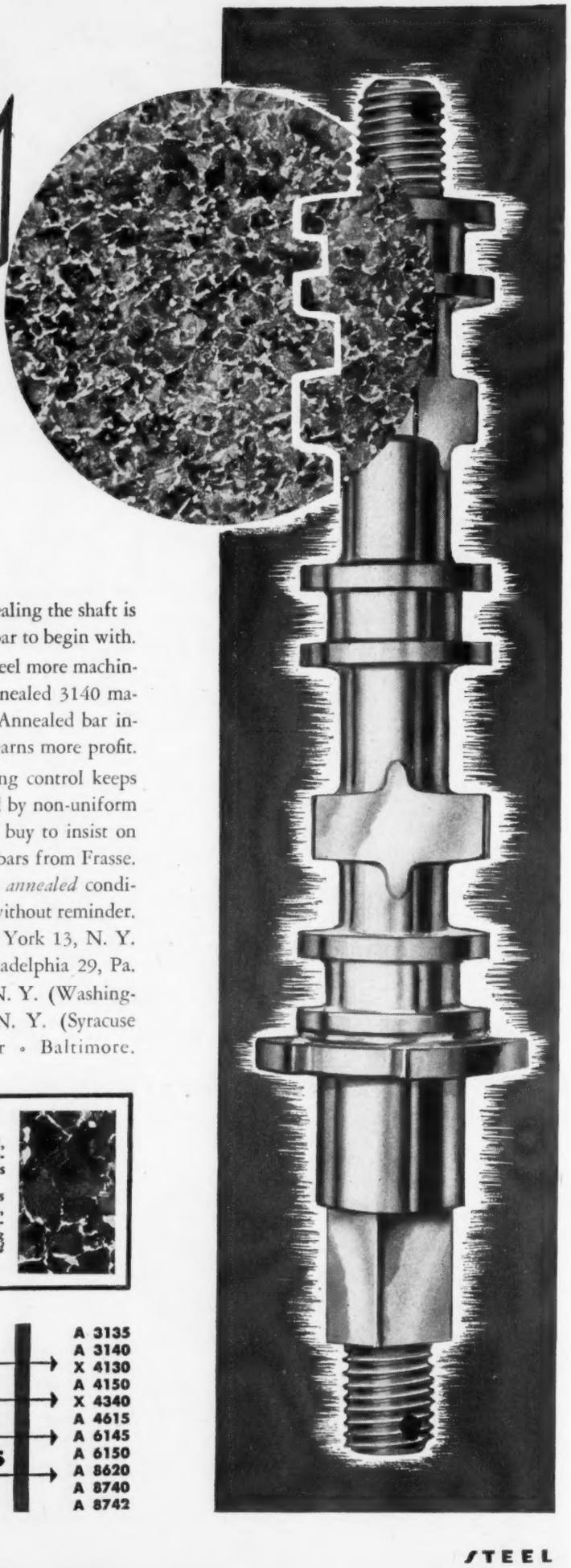
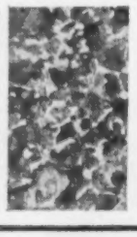
the hidden bargain in alloy steel



This camshaft is cut from alloy bar stock. Cost of annealing the shaft is less than ¼ of a cent—because it's cut from *annealed* bar to begin with.

See the rest of this bargain! Annealing makes the steel more machinable . . . and easier on the tools, too. In this case, annealed 3140 machines 14% faster than the same grade "as rolled". Annealed bar increases production, prolongs life of expensive tools, earns more profit.

It gives you *steadier* production, to boot. Annealing control keeps quality the same from bar to bar—an advantage lacked by non-uniform "as rolled" bars. For the trifling cost involved, it's a buy to insist on *annealed* alloy bars, just as it makes sense to get your bars from Frasse. Since the appropriate grades are stocked by Frasse in *annealed* condition only, you get the "annealing bargain" every time without reminder. Peter A. Frasse and Co., Inc., 17 Grand Street, New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Avenue, Philadelphia 29, Pa. (Radcliff 5-7100) • 50 Exchange Street, Buffalo 3, N. Y. (Washington 2000) • 157 Richmond Avenue, Syracuse 4, N. Y. (Syracuse 6-2103) • Jersey City • Hartford • Rochester • Baltimore.



For the Technical Minded:

Both photomicrographs (x 100) are hot rolled, 2¼" rd. AISI A3140 for comparison. Microstructure to left: annealed to 197 Brinell, right: as rolled, 229 Brinell.

Latest Frasse chart shows heat treat procedures for 60 alloy steels. Salient data for normalizing, annealing, hardening and carburizing is condensed on handy check chart. Also covers cooling mediums, tempering ranges, precautions. *Send for a free copy today.*

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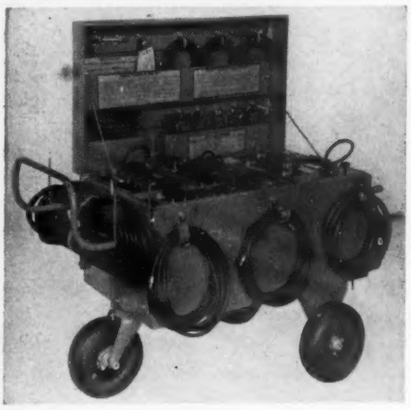
heater type dryer. Heating may be effected by electric calrods, oil or gas burning equipment.

Steel 1/27/47; *Item No.* 9983

Mobile Field Test Set

Designed and developed for use with aircraft by Red Star Products Co., Cleveland, in conjunction with Designers for Industry Inc. of the same city, the portable instrument field test set shown here conducts thirty simultaneous test operations. Unit affords protection to both



master instrument and those under test by a series of relief valves and calibrated orifices incorporated into tests.

It functionally divides testing operations into smaller groups, permitting nine separate tests to be run from one carrier. For specialized testing, superfluous units can be replaced with more of one type.

Steel 1/27/47; *Item No.* 9993

Truck is Quoted at $775

In an advertisement in the Jan. 6, 1947 issue of STEEL, page 261, Truckman, a product of Yard-Man Inc., Jackson, Mich., was quoted at $675, f.o.b. Jackson. This platform truck, designed to handle skidded loads up to one ton, should have been quoted at $775. The truck is gasoline powered, has two speeds and is equipped with a hydraulic lift.

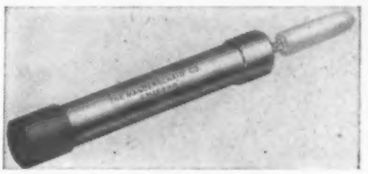
Parts Assorter

The Kari-All parts assorter, recently marketed by Diagraph-Bradley Industries, a division of Diagraph-Bradley Stencil Machine Corp., St. Louis, consists of a number of compartmented trays set in a ferris wheel arrangement. It can be fastened in an upright position, from a side wall, or from the ceiling, and operates equally effectively in all positions. Assorter is made in two sizes: Jumbo, 18 in. long; standard, 12 in. long, both models being 12 in. high. Bins can be adjusted to fit part sizes. "Ferris wheel" has a braking action which prevents tray with heaviest items from gravitating to the bottom.

Steel 1/27/47; *Item No.* 9917

Work Holding Spinner

Greater speed and more uniform results in polishing and buffing small round, cylindrical and flat circular parts is made possible by Midget work holding spinner



No. 221M, announced by Manderscheid Co., 810 Fulton street, Chicago 7. Only 7 in. long and weighing but 6 oz, the spinner facilitates quick and uniform polishing of small parts. Housing is fully enclosed to keep out dust and grit.

One-piece shaft and brake assembly of the spinner operate in grease-packed and sealed ball bearings. Shaft extension is 1/4-in. in diameter, 1 in. long, and machined flat on one side for holding the fixture with an Allen screw.

Steel 1/27/47; *Item No.* 9884

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 104.)

Induction Hardening of Steel

(*Concluded from Page* 89)

peated runs of the same job over a period of months.[23]

The high manganese, SAE 13XX steels have attractive possibilities for induction hardening applications, because they possess good machinability, satisfactory austenitizing response, and are not too expensive. In particular, the SAE 1350 steel is highly recommended for induction hardening jobs where good machinability and rapid austenitization are required.

Austenite Grain Growth: Previously it was shown that it is frequently necessary to induction-heat the steel to high temperatures to speed up the austenitizing reaction. This may have adverse effects upon the impact properties because of excessive grain coarsening at high temperature. Several investigators have shown that large austenite grains may form when the steel is induction heated.[24, 15] However, our experience has shown that grain coarsening does not occur at temperatures as high as 1000° C when the steel is heated very rapidly.

Micrographs in Fig. 42 illustrate the effect of time on austenite grain growth. The induction-heated sample has a decidedly smaller austenite grain size when heated to the same temperature as the furnace-heated sample, but that is to be expected since it has been heated a shorter time—less than 20 sec, as compared to 15 minutes. If the induction heating time is prolonged to about 30 sec, or the temperature exceeds 1000° C grain coarsening may be a serious problem.

It is impossible, at this time, to establish definite limits on grain-coarsening, temperature-time conditions. Best solution to the problem is to examine the structure under the microscope to see if the grain size is too large.

(*To be continued*)

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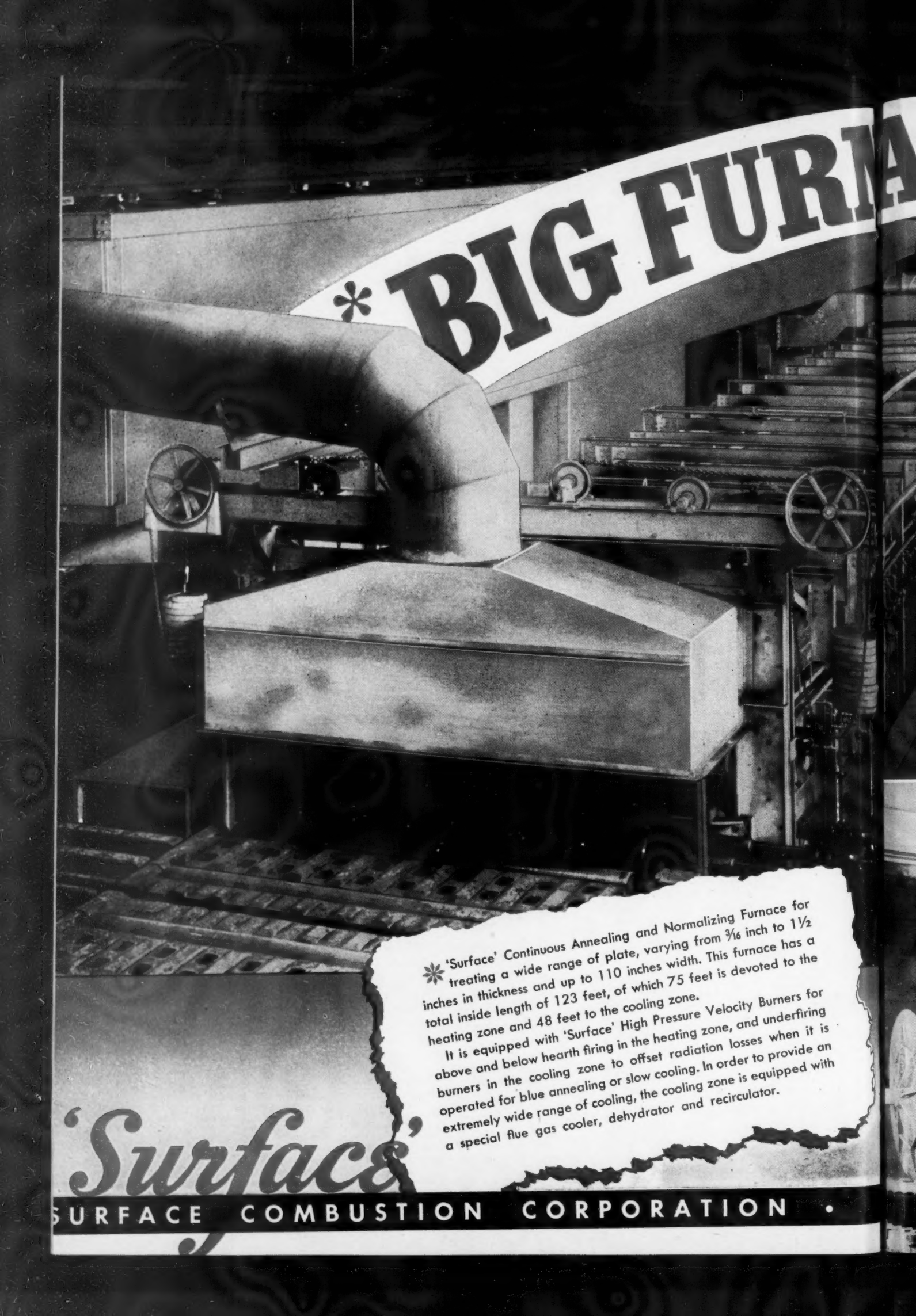

*'Surface' Continuous Annealing and Normalizing Furnace for treating a wide range of plate, varying from 3/16 inch to 1½ inches in thickness and up to 110 inches width. This furnace has a total inside length of 123 feet, of which 75 feet is devoted to the heating zone and 48 feet to the cooling zone.

It is equipped with 'Surface' High Pressure Velocity Burners for above and below hearth firing in the heating zone, and underfiring burners in the cooling zone to offset radiation losses when it is operated for blue annealing or slow cooling. In order to provide an extremely wide range of cooling, the cooling zone is equipped with a special flue gas cooler, dehydrator and recirculator.

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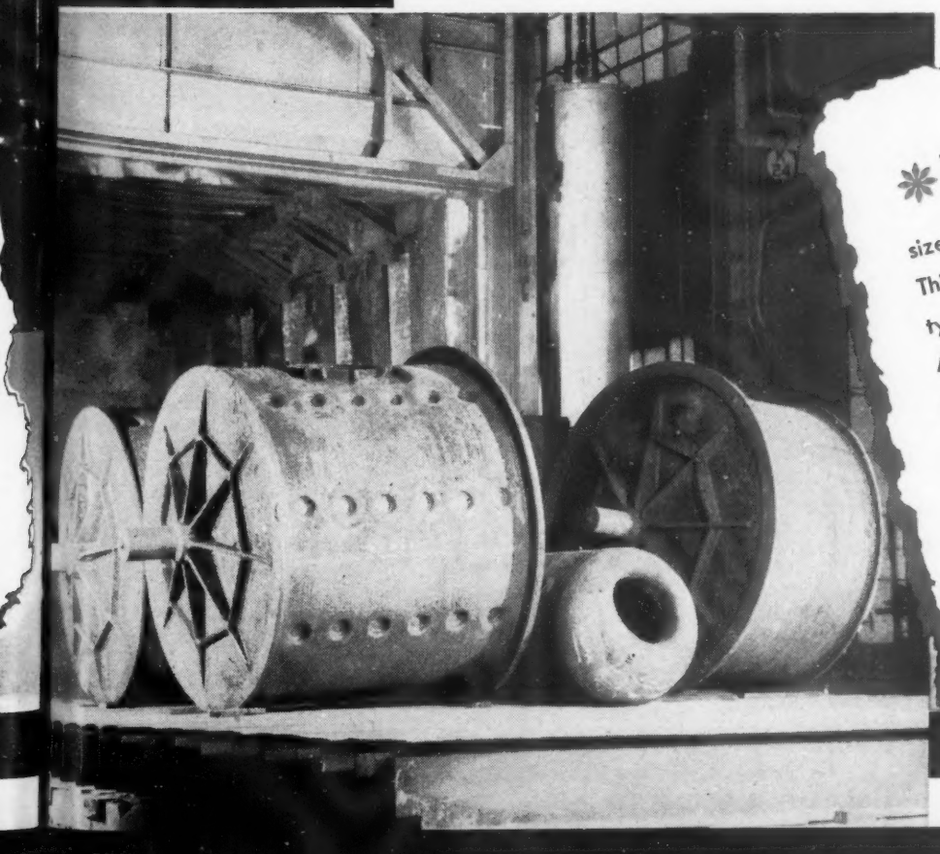
'Surface' PROVIDED FURNACES FOR SIZE, AND EXACTING CONTROL AND FLEXIBILITY OF USE, TOO!

FURNACE EQUIPMENT in steel producing and fabricating may necessarily be of special nature to meet the requirements of the materials to be processed. At Lukens Steel Company, and one of its subsidiaries, Lukenweld, Inc., this problem has been taken care of with the use of 'Surface' Industrial Furnace Equipment, especially engineered for the job.

Two of these units are herewith illustrated . . . a continuous annealer and normalizer—one of the largest of its type known for the processing of plate, and a giant size car-bottom type stress relieving furnace which utilizes convection heating in its operation.

These furnaces are representative of the almost unlimited kinds of furnaces and heating equipment 'Surface' offers to the steel mill. This equipment includes One-Way Fired Soaking Pits—Slab Heating Furnaces—Billet Reheating Furnaces—Continuous Heat Treating Furnaces for Plate—Pit Type Convection Furnaces for Annealing Rod, Wire, or Strip in coils—Continuous Strip Annealers and Normalizers—High Alloy Rod and Bar, Atmosphere Annealing Furnaces of Car-Bottom, Lift-Cover Type—Bright Annealing and Normalizing Furnaces for Tubing—Stress Relief Furnaces—Wire Patenting Furnaces—Annealing Covers, and the foremost equipment in Prepared Gas Atmosphere Generators for practically every heat treating operation.

It will pay you to submit your present heating and heat treating problems to 'Surface' for up-to-the-minute engineering advice and equipment.



'Surface' Car-Bottom Type Stress Relieving Furnace is used for various sized fabricated structural steel parts. This furnace is of a recirculating hot air type and is equipped with a 'Surface' Air Heater and a recirculating fan, mounted on the furnace top. It has a maximum load capacity of 80,000 pounds. Internal length from door to rear wall 21'-6"; Internal width from wall to wall 18'-6"; Width of car deck 16'-0", and height from top of rails to underside of return air ducts is 11'-0".

TOLEDO 1, OHIO

Brazing Insecticide Bombs

(*Continued from Page 73*)

and sent down chutes to stations for assembling the fusible metal and the valve. A belt conveyor then carries them to the air testing machine, which carries them automatically through a bath of water and ejects them onto a belt conveyor for roll marking, insecticide filling, and Freon filling.

The containers are then placed on an overhead chain conveyor and carried through the cleaning and phosphorizing sprays preparatory to lacquering. Remaining on this conveyor, they move through the lacquering operation and on to the inspection line. Following this, they are carried on a belt conveyor to stations for purging, inspection, labeling and packing.

Each unit of the complete layout is so designed that the net production rate of 10,000 pieces per 8-hour shift is obtainable.

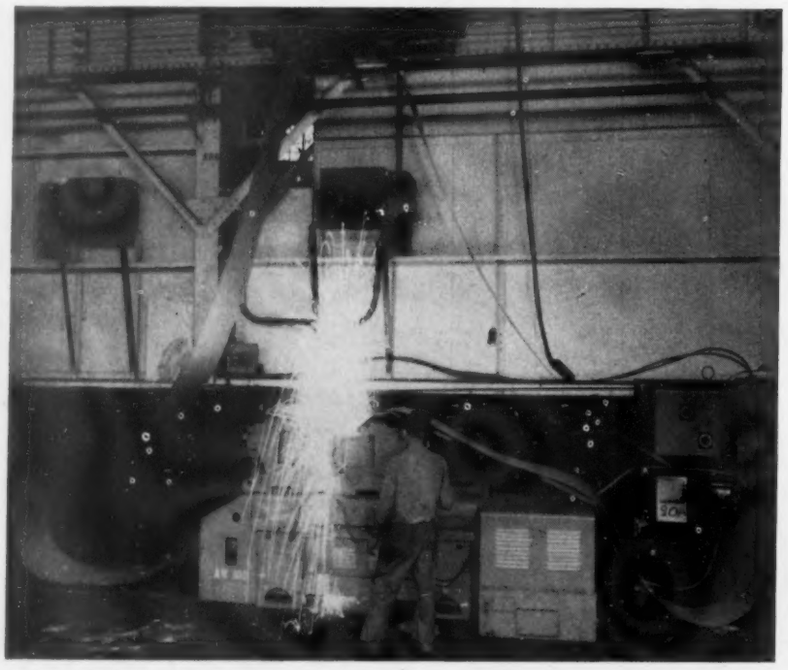
The valve body is made in two parts. This makes possible the formation of an irregular internal recess, which would be difficult or impossible to provide in one-piece construction. The two-piece construction is simple and inexpensive. The two halves are pressed together in a specially-designed dial press.

The valve body and the female shell are sized so as to join with a free fit. After assembling these two parts, a broken-ring stake is applied to stake the shell around the hole at four points to lock the components together securely. This not only assures proper relationship of the parts, but prevents them from separating during handling or subsequent operations, or during the trip through the furnace.

The copper butterfly brazing washer is applied to the siphon tube, Fig. 6, and the end of the tube is pressed into the valve body, Fig. 5 (left). The tube is then bent by means of foot presses. This press fit not only holds the siphon tube in place during subsequent operations, but also assures a tight bond.

Next, the male shell is pressed into the female shell, with a press fit of from 0.002 to 0.010-in., as shown at the right in Fig. 5. The overlap in this joint is ⅜-in. This operation is performed in a fixture consisting of an air-cylinder actuated ram and an air-cylinder actuated full-book. Approximately 1600 psi are required to make this drive.

A belt conveyor carries the assembled containers to hoppers at the loading station on the gravity conveyor alongside one furnace. At this point, Fig. 2, operators assemble the midriff brazing rings on the containers. They are then loaded, valve body down, into the brazing tray. The tray holds 54 containers and is built to hold them in the upright position, to allow the molten copper to flow by gravity into the joints.



CLOSE FIT: Aligned within a half-thousandth of an inch, butt ends of this 66-ft strip of stainless steel are welded to form an endless polishing belt at American Welding & Mfg. Co., Warren, O. Used in the finishing of plastic white wall tire rims, the belts are of type 301 stainless, 0.035 x 24 in., and are processed on a 250 kva automatic butt welder

The tray, 24 x 36 in., is fabricated from thin sheet stock of Inconel heat-resisting alloy, weighs about 50 lb and is made of flexible construction to minimize stresses from heat shock. Each empty container weighs about 1 lb, giving a total of 54 lb net per tray. Gross weight is approximately 104 lb per tray.

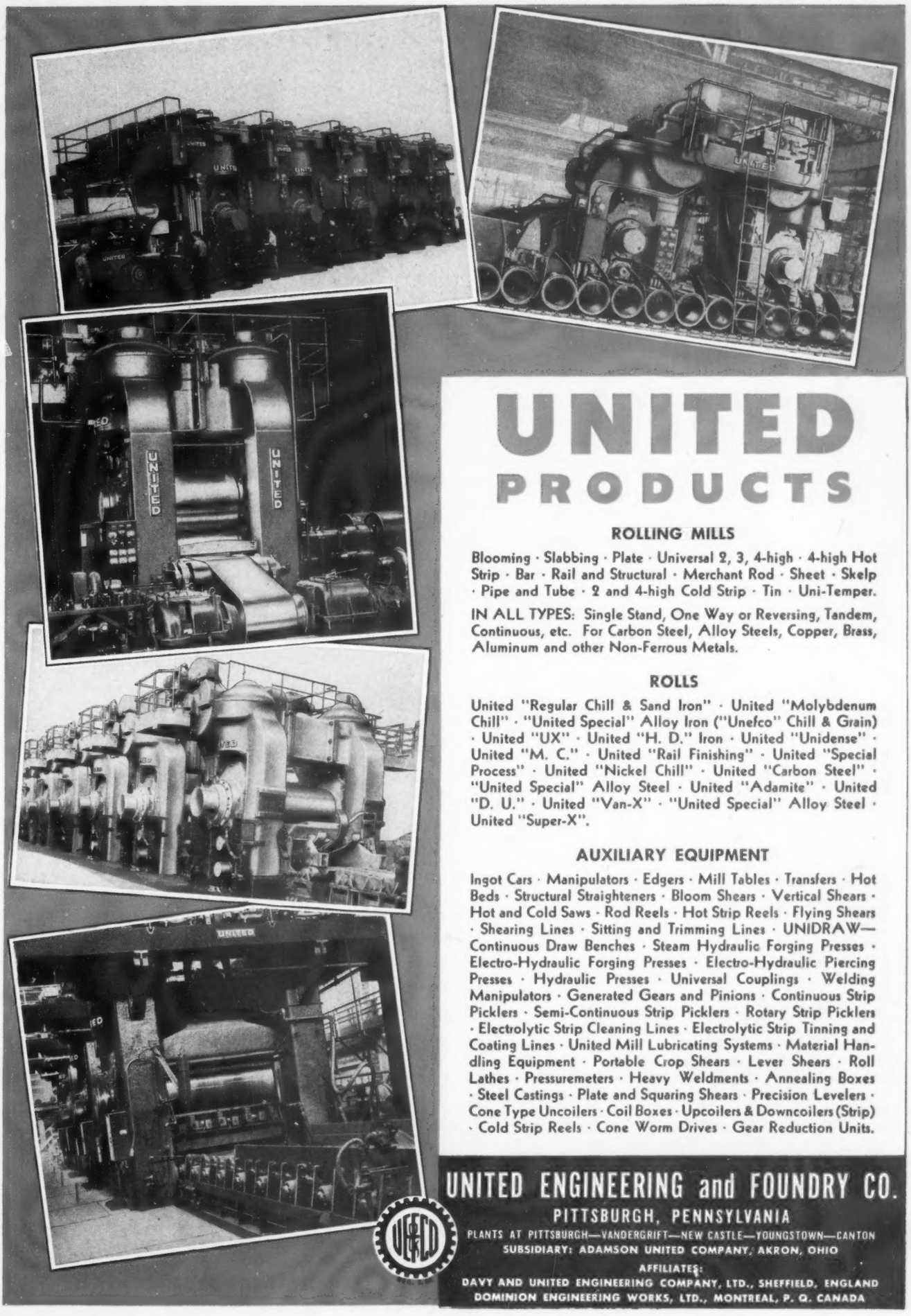
In order to permit flexibility in the rate of loading the trays and charging them into the furnace, a spur conveyor is provided for storage of loaded trays. Transfer of trays to this spur conveyor is accomplished on the manually-operated transfer table shown in the foreground.

Trays are carried from the return conveyor or the spur conveyor by means of the manually-operated transfer table to a gravity end-table in front of either of the two roller hearth brazing furnaces. When a tray is rolled to a position near the normally-closed charging door of the furnace, Fig. 7, it intercepts the beam of a photoelectric relay. This makes it possible for the tray to be automatically charged into the charging vestibule as soon as the preceding tray in that vestibule has gotten out of the way. That condition is indicated by passing of the preceding tray out of the beam of an electric eye located about 4 ft inside the charging vestibule.

When this beam closes, a time delay relay starts, to allow the tray to continue a little further, so that the oncoming tray will not strike it. Then the motor-operated door rises and the new tray is driven in by an auxiliary over-running drive mechanism, which is motor-operated until the tray intercepts the beam of the electric-eye within the charging vestibule. At this instant, the charging drive stops and the door closes, thus completing the charging cycle. While the door is open, which is only about 5 sec, a gas flame curtain plays across the opening from a pipe beneath it, to burn air which tries to enter and help maintain purity in the furnace atmosphere.

Brazing Furnaces: Each roller hearth copper brazing furnace consists essentially of a heating chamber and an adjoining water-jacketed cooling chamber. The heating chamber is equipped with electric heating units, rated 180 kw, divided into two 90-kw zones in the length, each with separate power and temperature control. The heating units are made of heavy rolled ribbon, formed in sinuous loops, mounted in the roof and on the side walls above and below the roller conveyor. The heating chamber is 9 ft and the cooling chamber is 30 ft long.

The cooling chamber is made of two concentric rectangular steel shells to provide a water jacket, and is divided into three sections in the length, each with separate water circuits. The first



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and hottest section has automatic cooling water temperature control to prevent condensation during idling periods.

Hollow cast alloy rolls are used throughout the charging vestibule, heating chamber, and first section of the cooling chamber. Solid steel rolls are employed in the remaining sections of the cooling chamber. Water-jacketed, self-aligning roller bearings are mounted on the sides of the casing throughout the length, except for the last two cooling chamber sections, which do not require the water cooling. Sprockets on one end of each roll are connected by a roller chain to the main conveyor driving mechanism having motor, speed reducer, and speed changer with 6-to-1 speed range. Take-ups are provided in the chain for both the heating and cooling sections. The chain, sprockets, and take-ups are all enclosed in gas-tight housings running along one side of the furnace with removable cover plates. A clutch is provided to disengage the driving mechanism so that the rolls can be turned manually in event of power failure.

Each furnace is capable of brazing 700 containers per hour, which is a production of 700 lb net, or 1352 gross per hour. For this rate of production, the power consumption is about 157 kw hr per hour. Consumption of combusted gas for the furnace atmosphere is about 1500 cu ft per hour, which is made by burning about 675 cu ft per hour coke oven gas.

When a tray in the cooling chamber approaches the discharge door, it intercepts the beam of another electric eye. This causes the door to rise, and an automatic runout drive to start and to carry the tray out of the furnace, both operations being performed by motor-operated mechanisms with control, (Fig. 8). As soon as the tray has cleared the door, the door lowers and the auxiliary drive stops. At this point, the containers are at about 300° F, and cool enough so that they will not discolor in the air. However, for convenience in handling the work, the trayload is subjected to additional cooling by means of an air blast provided over the discharge table. Then the tray makes a U-turn on the conveyor.

When it is about a third of the way along the return conveyor it reaches the unloading station. At this point the brazed containers are manually removed from the tray, and visually inspected. Then they are placed on chutes for transportation to the next operation. The tray is then passed on to the loading station on the return conveyor.

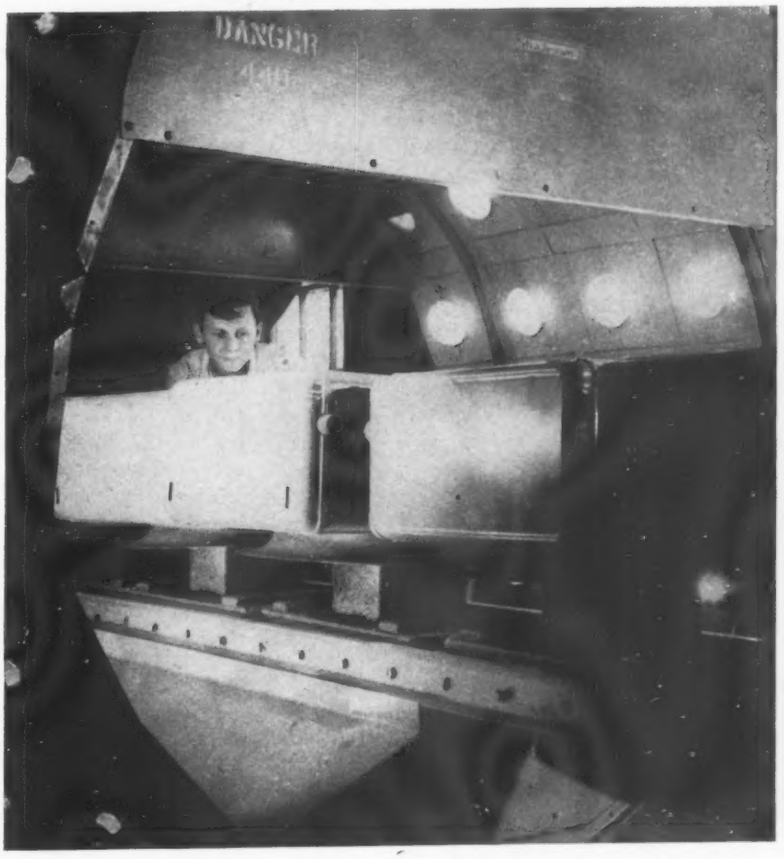
Inserting Fusible Plug: The Compressed Gas Manufacturers' Association has published recommendations for the design and construction of safety devices applied to compressed gas cylinders for dichlorodifluoromethane. A fusible plug with yield temperature not less than 157° F nor over 170° F is required for containers of liquefied gases. The required minimum cross sectional area of the safety discharge channel is 0.003-sq in. Purpose of this safety device is to prevent the rupture of a normally charged cylinder when subjected to some unusual condition resulting in abnormally high temperature. The fusible metal will yield at the predetermined temperature to permit escape of the gas without rocketing effects.

Accordingly, fusible metal with a melting point in the specified range is inserted in the recess shown in the end of the male shell, Fig. 3. This is accomplished by locally heating the fluxed recess with an electric iron and then filling in with the fusible metal provided in wire form.

Following insertion of the fusible metal, a dispensing valve is assembled on the container. This valve is shown in the section drawing Fig. 3. When the container is empty, a backing spring pushes a nickel plated brass valve cup against a synthetic rubber packing which is impervious to attack by the contents of the Aer-a-sol. But when the container is filled, this spring pressure is augmented by the vapor pressure of the contents. Thus under all conditions, the valve is normally closed.

The nickel-plated brass spray head has a tiny orifice in the end for dispensing the insecticide. To release the insecticide, the spray head is turned on its threaded connection with the valve body, which causes a plunger assembly to push on the valve cup and release the seal between the valve cup and the packing. The insecticide then travels up through the plunger sleeve, around the plunger screw, and out of the orifice. Turning the spray head back closes the valve. In fact, the spray head can be completely removed without any loss of the contents or without danger of the spray head flying.

Air Pressure Test: After assembly of the fusible plug and the valve, each container is given an air pressure test, Fig. 9. The containers are manually placed on a conveyor by an operator



HEAT FOR HEATERS: Unit heaters are shown here being dried by a battery of 50 infrared lamps that have cut drying time about 75 per cent. Now in quantity production at B. F. Sturtevant Co. division of Westinghouse in Hyde Park, Mass., the heaters are completely dry after 3 min in the 150° oven. When installed, these so-called "speed heaters" supply, every minute, more than 1300 cu ft of air warmed to 120°

STEEL CARRIER

. . . simplifies truck tire changing

KNOWLEDGE of truck tire changing difficulties gained from many years of experience in the tire business motivated a California inventor to develop a new steel tire carrier, shown here, which makes the changing of heavy truck tires and wheels a one man job. No straining or lifting is necessary to remove the spare, and replace the flat.

To change a tire, holding clamps are released and the cradle portion of carrier which holds the tire and wheel is pulled out and away from truck body to a position where the tire is clear and can be tilted upright while it is still attached to the carrier. Tire then rests on the ground and when detached from carrier by the removal of holding clamp, it may be rolled to wheel requiring replacement.

The flat is rolled to carrier and clamped to the cradle while in upright position, after which it is tilted on cradle swivel to horizontal position, pushed back under chassis in carrying position and securely fastened there with positive clamps.

As illustrated in the accompanying photographs, the carrier is bolted to the chassis frame of truck either at the rear or at the side. It is constructed to withstand a load stress equal to four times the load it carries under normal use. Manufactured by the T. E. D. Corp., Los Angeles, the carrier will be sold through truck dealers.

(right), charged with dehydrated air at 200 psi for the 15 oz container or 400 psi for the 16 oz container. The containers travel through a water bath for 30 sec; leakers are marked, then the containers are carried out of the water bath and evacuated. The containers are discharged onto a conveyor where those failing to pass the test are rejected. This testing machine is entirely automatic and assures correct testing without errors which otherwise might be attributed to the human element.

In addition to testing each container with air pressure as described above, samples picked at random are tested to meet rigid Interstate Commerce Commission specifications. Containers must be designed to assure a safe wall stress, with adequate wall thickness and proper heat treating. The material is specified as to carbon, phosphorus, and sulphur content and must be open hearth or electrolytic steel. A certified analysis of each heat of steel is furnished by the manufacturer and, in the case of the 15 oz bomb, this must be tied in with each lot of 3000 dispensers or less. One out of each 3000 cylinders successfully produced is hydrostatically tested to destruction in the equipment shown in Fig. 10 and burst in the neighborhood of 2000 psi. One is flattened between knife edges and must not have cracks when the outer surfaces of the walls are apart not more than a distance of six times the thickness of the wall. One is checked for cubic inch capacity and is then cut in half to determine the minimum wall thickness. Similar tests are made on the 16 oz container, with the exception that a lot constitutes 1000 pieces or less successfully produced, instead of 3000. These cylinders burst in the neighborhood of 2400 psi.

Fig. 11 shows a close-up of a typical failure after the bursting test has been applied to a 16 oz container. This container ruptured at 2400 psi. Notice the stretching of the grain. This is a typical fracture, the container attempting to assume a spherical shape until the yield point is reached. A rupture always starts in the single layer of steel and tears down across the brazed, overlapping joint.

After being filled, the containers are placed on an overhead chain conveyor and carried through cleaning and phosphorizing sprays, preparatory to lacquering. Then the conveyor carries them through a spray booth, where they are lacquered, and onto the inspection line. Fig. 10 shows the lacquered containers being taken off the conveyor for inspection. Here each container is again weighed and purged to make sure it gives a correct spray. The bombs are then placed on a belt conveyor and carried to stations for applying gummed paper labels, final visual inspection and packing.

Answer to Smoke Problem

Elimination of smoke from coal-fired stationary plants by jets which force air into the furnace and mixing it with unburned gases is covered in the booklet "Application of Overfire Jets to Prevent Smoke in Stationary Plants" being distributed by Bituminous Coal Research Inc., Pittsburgh 22.

•Written by Richard B. Engdahl of Battelle Memorial Institute, Columbus, O., booklet gives suitable methods for installing jets. Instructions assist in choosing a satisfactory size tube for introducing the air, how far apart they should be and where they should be placed in the furnace wall.

YOU NEED TO REDUCE THE WEIGHT OF YOUR SETTINGS

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For example: those who alloy and refine the soft metals want lighter pots for easier tilting and cleaning between melts. KEMP immersion elements can be hoisted out at any time, leaving the pot clear—and all you have to tip is the pot itself, not a ton of brickwork.

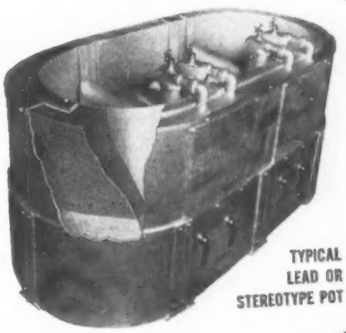
For example: any tinplate mill can follow the cue of one of the largest in the East, and cut 40% off its gas bill by switching its stacks from side-firing (through the pot) to KEMP immersion-firing (inside the pot).

For example: heat treaters can minimize chemical attack by molten salt at the liquid line through KEMP pots with stainless steel bands welded in at that point.

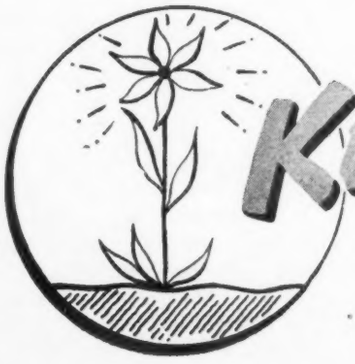
And so it goes! The coupon below will put KEMP on the trail of your soft-metal or salt melting problems.

REMEMBER THESE VIRTUES OF KEMP IMMERSION FIRING

1. The pot is heated only by the molten materials. Therefore, the temperature gradient across the pot wall is *down* (not *up*) from the bath temperature.
2. No refractory structures are needed to form a combustion chamber. Light mineral wool insulation around the pot is all that's needed.
3. Spent combustion products are vented down over the bath. They blanket the surface to exclude air (reducing dross) and lower heat losses from the molten surface.



TYPICAL LEAD OR STEREOTYPE POT



PRECISION CARBURETION ✚ ADAPTED COMBUSTION
FOR INDUSTRY'S HEAT-USING PROCESSES
ATMOSPHERE GENERATION & ADSORPTIVE DRYER SYSTEMS
FOR PROCESS CONTROL AND PROTECTION

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..... ☐

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PLACE.....

Ball Bushings

(*Concluded from Page 75*)

may permit higher operating speed and thereby increase the productivity of the machine.

In other installations, where linkage systems of the type illustrated in Fig. 3 are utilized to actuate oscillating parts, the use of ball bushings, because of their very low friction coefficient, permits operation at small linkage angles. As a result, it becomes entirely feasible to use mechanical linkage arrangements which otherwise would be impracticable.

Initial starting strains and resulting adverse effect on the life of motors, gears, belts, linkages and other parts are materially reduced by the use of ball bushings. In the long run a very substantial reduction in maintenance and servicing costs is sure to result from an elimination of the need for constant vigilance and frequent oiling. In addition to reduced maintenance and servicing costs, a machine combining linear ball bushings with ball and roller revolving bearings generally will have substantially greater reliability and also have a much longer life between overhauls.

Basic Operating Principle: The ball bushing, like ball and roller bearings, operates on the principle of rolling action, involving basically the use of a series of balls or rollers guided between two surfaces in such a way as to support a substantial load and yet permit a nearly frictionless relative motion of the surfaces, as indicated by the arrow of Fig. 3. Inasmuch as straight away travel of balls continue for only a small distance longitudinally before the balls will begin to roll out from between the surfaces, the mounting shown in Fig. 3 at best is limited to a short range of antifriction travel. Therefore design of a practical bearing for unlimited travel necessitates provision of some means of continuous return of balls to the opposite end of their working track after they have passed through the loaded or working range.

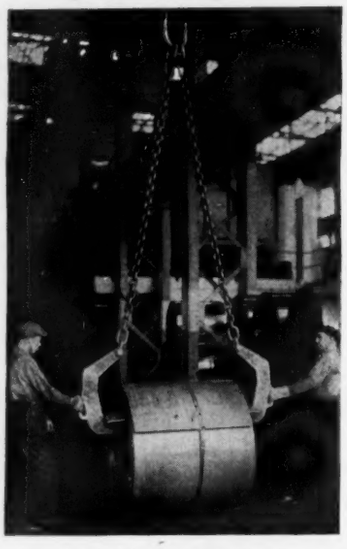
In the case of ball and roller bearings for rotation, this requirement is automatically satisfied due to the fact the loaded surfaces from complete circles, as shown in Fig. 2. Accordingly, the bearing track may be considered to be made up of a working portion including, in Fig. 2, the loaded balls, 1 to 6 inclusive, and a return portion containing the remainder of the balls.

In ball bushings the necessary ball recirculation is accomplished by the simple expedient of providing continuous oblong tracks in which the balls are free to roll. Each track includes a working portion in which the balls are loaded and a return portion of unloaded balls, simulating the circuit for ball and roller bearings for rotation as indicated in Fig. 2A.

There are several possible basic design arrangements for antifriction linear travel bearings. Considerations of required service, including such factors as loading, life and operating speeds, together with a careful study of manufacturing technique, enter into the selection of a final design.

The type of ball bushing with which this article primarily is concerned represent the culmination of extensive research and study involving a critical analysis of a large variety of practical service requirements, accompanied by painstaking experimentation with numerous different design arrangements and production techniques. The resulting design satisfies virtually all actual service needs. The ball tracks are nestled as closely as practicable to the shaft for the sake of optimum compactness. Close precision machining and rigid inspection insure tolerances in line with high quality instrument needs and yet the construction is rugged enough for heavy duty industrial service.

These standard ball bushings, at present are made for round shafts only. They have from three to six ball circuits each, depending on the size of the bushing, these circuits being evenly distributed radially around the shaft. Standard shaft diameters range from ¼ to 1 in. inclusive in ⅛-in. increments, from 1 to 3 in. inclusive in ¼-in. increments, and from 3 to 4 in. inclusive in ½-in. increments. Corresponding outside diameters of the bushings range progressively from ½ to 5¾-in., with overall length varying from ¾ to 7¾-in. All of these standard ball bushings have an effective ball contact or working length of a little more than one shaft diameter.



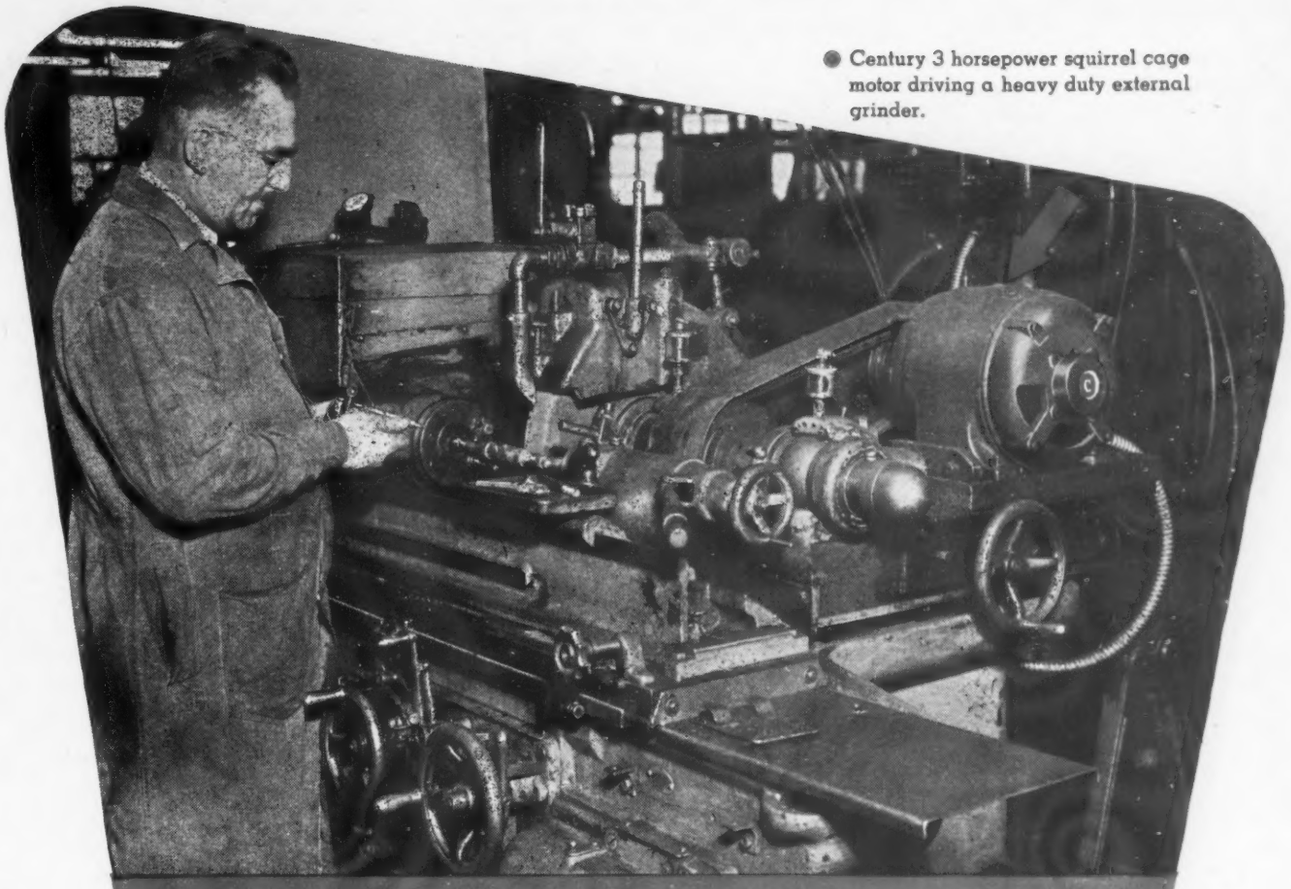
COIL HOOKS: Handling of heavy coils of sheet steel at the Rouge plant of Ford Motor Co. is simplified and less hazardous since the development of this new type hook, forged of special alloy steel and carried by a high-tensile strength chain. Designed to carry a maximum of 15 tons safely, the hook can be used to lift coils at the top of a pile, employing a long pole-hook to guide the fingers to proper position

Special purpose ball bushings now being developed and tested eventually will be available in the standard line. Examples are the square or rectangular type which permit transmission of torque through an antfriction linear bearing—in effect a ball bearing spline. The flat type is for antifriction bearing on V-ways or flat beds. Other versions of this permit their use on half round or round shafts. The principle has been applied to hangers for sliding doors or other objects which travel on rails.

Understanding of ball bushing construction and operation principles can be gained from Fig. 1. This is a cutaway perspective view of a typical four-circuit, round-shaft, standard ball bushing. In the upper straight portion of the partially exposed ball circuit, it will be noted that balls contact both the shaft and the ground inner diameter of the sleeve, thereby carrying the load. This portion of the ball circuit is called the working track. Balls throughout the remainder of the circuit roll unloaded in the "return" path defined by the groove between island and retainer.

Load-carrying contact between shaft and sleeve is avoided by the provision of longitudinal grooves in the sleeve to form the relieved return tracks, together with internal bevel cuts in the ends of the sleeve to unload the balls during the end portions of each circuit. Resulting ball action, whereby the balls alternately become loaded and unloaded as they travel around the closed ball circuit, simulates the operation of a conventional rotating ball bearing as shown in Fig. 2. Hence the ball bushing, by unique design, applies to linear travel the same basic antifriction principles that are inherent in rotational ball and roller bearings.

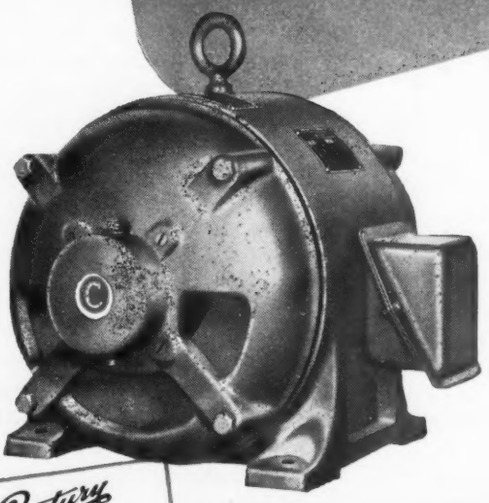
Range of possible applications for the ball bushing obviously is broad, for it appears to be equally well suited for service in linear motion on equipment ranging from business machines and delicate precision instruments to rugged farm machinery, big presses and heavy machine tools.



● Century 3 horsepower squirrel cage motor driving a heavy duty external grinder.

Century Motors' *Accurate Balance*

Helps Maintain Machine Tool Accuracy



Accurate mechanical and electrical balance gives Century motors the smooth operation necessary to keep vibration to a minimum — to help maintain all the accuracy built into your machine tools.

The motor frame and end brackets are ruggedly built and accurately machined to form a rigid housing. Mounting feet are accurately machined — bearings are precision finished — scientific cooling system carries off heat — windings are sealed with Century triple insulation. All these features and many more give Century motors the stamina to maintain their freedom from vibration and to withstand the toughest kind of operating conditions.

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497

Measuring Idle Time

(*Continued from Page 77*)

working force. The extent of such idle time may be and often is beyond even the most pessimistic estimates; conceivably this could lead to hesitation on the part of management to attempt too accurate a study of the difficulty because of the adverse reflections it might cast upon management in the eyes of, say, the company board of directors. This is of course at best conjecture, for the simple reason that in most production operations there is no effective means to isolate and totalize delays which may or may not be the fault of the workingman himself.

This leads to the question of how to measure idle time accurately, graphically and effectively. Various systems have been attempted, ranging from a simple examination of peak power load fluctuations through the use of time study personnel and the employment of "checkers" in fairly large numbers to keep records of production time and "down" time. Each has shortcomings which negate its value. Peak load fluctuations simply disclose when excessive idle time develops; they do not tell on what machines it occurred or what the causes might have been. Use of checkers and time study personnel suffers from the lack of sufficient numbers of qualified persons to do the work, and because such studies are made only at intervals and thus constitute only a sampling; there is no continuous record made over a period of time. Further, recognition must be given to the personal factor in such observations, which may color them unfairly.

After many years of using and studying various systems for the control of idle time, National Acme introduced, some 15 years ago, an electrical recording device known as the Chronolog, for the express purpose of determining accurately the degree of idle time on machines or groups of machines, and the causes thereof. The instrument was first described in STEEL, Oct. 3, 1932, p. 27, and since that time its use and refinement has continued uninterruptedly if albeit rather spasmodically, since the company felt it was exploring new ground and desired to progress cautiously.

Exact Causes of Idle Time

Here is how National Acme has approached the problem: First, it was granted that existing methods of time study, motion study, etc., had performed their functions in aiding the efficient operation of individual machines and processes; but that in itself was not believed to be enough. There still existed in all plants, even the most efficient, an unmeasured amount of idle time, about which this much at least was known—the exact extent was vague; the exact causes were at best only suspected; and a considerable proportion of this idle time was not caused by either the individual machine or its operator.

Second, a new approach to the understanding of a large manufacturing plant was evolved. It is obvious the sole function of a manufacturing establishment is to make things. Comparing a large plant with a one-man "alley shop," the only important difference is that in the one-man shop the individual not only must produce the work but also must be his own purchasing agent, janitor, set-up man, inspector, maintenance man, etc., while in a large plant these functions are separated and assigned to special groups so that men on the machines can produce without interruption. Still it remains true the sole function of the plant is to produce things. All departments—inspection, set-up, machine repair, electrical repair, tool crib, plant engineers, foremen and the others—are aimed at the producing process. The degree of perfection of the operation of the plant as a whole depends on how well these departments co-ordinate their efforts. Any degree of loss of co-ordination results in idle time, not a spectacular shutdown of the plant, perhaps, but in constant, small, apparently unimportant and irregularly occurring shutdowns of individual machines. Thus the measure of the performance of these individual departments can be obtained by a careful and accurate measurement of the idle time of all machines and the determination of its causes.

The Chronolog system is based on the above concepts. Obviously, to measure idle time of individual machines an attachment to individual machines is necessary and Chronolog equipment is so attached. But it is not for the purpose of a conventional "time study," as many operators suspicion and as many labor union leaders adamantly maintain. The instrument does not break down the machine operation into elements; it simply records the amount of idle time of the machine and provides a means for the operator himself to show why the machine is idle. Its recording of the idle time of a particular machine is for the purpose of an overall study and not for the purpose of studying the machine and its operator solely as an individual unit.

The point which labor does not seem yet to grasp is that management recognizes a substantial portion of idle time of any one machine is beyond the control of the machine operator. The Chronolog provides simply a means of finding out what are the underlying causes for idle time in the department or the plant so that the plant as a whole can produce more things at lower cost with consequent lower prices to the consumer, higher wages to labor and more profit to the company.

When these concepts are carefully and patiently explained to working forces, it is quite possible they will favor the use of the instrument—perhaps even insist on it—for it may be to their own economic advantage to have the causes of idle time known in detail and subse-

NEW LITERATURE

HOW TO FIGHT FIRES AND PROTECT PROPERTY
By Randolph Laboratories Inc., 8 East Kinzie street, Chicago 11. A 20-page booklet which graphically explains and illustrates latest techniques in fighting fires.

COLD CHAMBER DIE CASTING
By Hydropress Inc., 572 Lexington avenue, New York 22. Folder L-24-C discusses the principles of Hydrocast die casting in detail and three typical stages are diagrammed.

TUBING HEAD
By National Supply Co., P. O. Box 899A, Toledo 1, O. Bulletin No. 327, illustrated, 4 pages, describing Type W tubing head.

GEARS
By Abart Gear & Machine Co., 4832 West 16th street, Chicago 50. Bulletin, illustrated and in colors, contains engineering data on spur, bevel, worms, helical, internal, worm wheels, spiral, sprockets and racks, precision cut of any gear material.

FORMULAS AND PROCESSING
By Eastman Kodak Co., Rochester, N. Y. Third revised edition contains comprehensive list of formulas together with discussion of principles and procedures for processing films, plates and pages; plus a new section on negative faults.

PRECISION BALL BEARINGS
By Jack & Heintz Precision Industries Inc., Cleveland 1. Catalog 2000, illustrated, discusses various applications of bearings, phases of their manufacture and data.

PRESSURE PACK EQUIPMENT
By National Supply Co., P. O. Box 899A, Toledo 1, O. Bulletin No. 328 gives list of specifications and detailed blueprints of equipment and features series of photographs and captions showing how to install equipment.

CHUCKS AND COLLETS
By Procunier Safety Chuck Co., 18 South Clinton street, Chicago 6. Two-color brochure on features of quick change chucks and collets.

MOTOR SERVICE
By Westinghouse Electric Corp., Box 868, Pittsburgh 30. A 12-page booklet describing in detail three service plans to provide 100 per cent service coverage for all fractional horsepower motors, telling who is entitled to use them, how they operate and what can be accomplished by them.

This RED BADGE of Merit

IS WELL-EARNED BY ALL PRODUCTS THAT WEAR IT

This "ribbon-etch" marks the products made by the longest-experienced manufacturer of cutting tools. And this mark means these 4 things:

1. It means that the product is made of special steel, usually from Simonds' own modern electric steel mills.

2. It means that the product is fabricated in the world's first windowless plant, where all working conditions are constantly controlled to keep workers' well-being and product-quality at top level.

3. It means that the product has been tested and re-tested to make sure you get full Simonds quality in every order. (There's no "second grade" in this line.)

4. It means that the product is represented, *to you,* by Simonds cutting-tool engineers... and by distributors and dealers . . . whose engineering judgment and sales counsel is as sound as the product itself.

And wherever this mark appears in *your* operations, *it will mark a deep cut in your cutting costs.*

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quently corrected. The principal difficulty in getting such a story across to the man at the machine, especially in large organizations, lies in breaking through the so-called "political front" of labor unions and reaching the rank and file.

Along with the explanation and interpretation of Chronolog system to working forces must be a similar explanation to management and supervisory personnel, for if the latter do not have a reasonable understanding of the system they will be suspicious of results and hesitant about taking corrective steps, lest in so doing they might seem to be acknowledging errors in their previous practice. The Chronolog is not a device for pointing an accusing mechanical finger at anyone—workman or supervision. It is a new tool for determining information hitherto not susceptible to accurate measurement.

Here are the machanics of the Chronolog and its use. Each unit is connected to its machine in such a manner that the instrument automatically accumulates and registers all idle time of the machine and the count of production; causes of idle time are inprinted on the record by the machine operator indexing a symbol dial. The printed record (or tape) has all the following data: All idle time, symbols to indicate the causes of idle time, production count and clock time, the accumulation of all this data automatically being printed on the tape every 10 minutes. Since the aim of this device is the making of accurate records, the elimination of the human element is a basic consideration. Hence the Chronolog is fully automatic in operation except for two functions by the machine operator: (1) To turn the instrument on at the beginning and off at the end of his shift; and (2) to index the symbol dial whenever his machine becomes idle.

In addition to the data being printed on the tape, all the accumulated data is visible to the operator and to supervision so that at any time during the shift a glance at the record will indicate the progress or lack of progress of the job and will draw attention to machines requiring it. Some additional features on the devise are: A red light automatically flashes when the machine becomes idle so that the attention of supervision is called to the machine; in addition to the clock number of the operator being shown on the tape, means is provided for a printed recording of visits to the machine by inspectors, set-up men, repair men, etc. Idle time is broken down into "accounted for" (when the operator dials) and "unaccounted for" (when the operator fails to dial) periods so that at all times the total amount of all idle time is exactly known .

The Chronolog is energized by the regular 110-volt lighting circuit. Installation is easily made and application can be made to machine tools, conveyors, mills or any type of production equipment.

Recording tapes are removed once each shift or daily. Recapitulation of the data is made readily with regular clerical help. This recapitulated data from each individual instrument then is summarized on charts showing the operation of an entire group of machines or an entire department. From this complete and accurate picture, management and supervision can then take steps to correct the conditions causing idle time with complete confidence because their actions are based on accurate data rather than on personal opinions.

Individual installations of Chronologs are preferably made on large pieces of equipment such as glass blowing machines, rolling mills and the like. In manufacturing establishments where the processes are largely handled or machine tools installations of the instrument are made on an entire group of machines or departments so that the daily summary of the entire group can be recorded to evaluate the reasons for idle time. The experience of users has shown that such an application is much preferable to the study of individual machines, since it gives a representative diagnosis of the operations and thus permits a more accurate analysis which produces concrete results in the reduction of idle time and the consequent increase in productivity.

DEBURRS CASTINGS: Small motor-driven cutters were found to remove burrs from machined aluminum castings effectively at the Mansfield works of Westinghouse Electric Corp. Machine shown here is equipped with two cutters mounted on the same shaft, and preset for correct burring action. Casting is held in place against a cam of the same shape as itself by a small friction pad; turning of handwheel rotates friction pad, also cam and casting. Cutter spindle is driven by a belt hooked up to a small motor underneath machine base

Double Wall Tubing

(*Continued from Page 76*)

that its cooling rate is high and is further increased by its greater strength, which makes possible the use of thinner walls.

The double wall construction endows the tubing with a mechanical strength enabling it to resist denting, collapsing, or any tendency to burst under pressures. Resistance of nickel to rust and to the formation of other corrosion products protects the purity of the products handled, as is the case with all nickel equipment in the brewing and food processing industries. The tubing can be readily cleaned both inside and out with

any of the ordinary cleaning compounds.

The tubing is made by first plating Monel or nickel strip with a bonding metal and then continuously rolling twice laterally, as shown in the illustrations. Edges are beveled in rolling, Fig. 2, so that there is no appreciable thickening of the joint in the finished tube.

The thin plate of bonding metal coating on the strip acts as a fastening agent when the coiled tubing is placed in the heating unit at high temperatures which are closely controlled. During the process, the metal diffuses into the Monel or

TABLE I
PROPERTIES OF BUNDYWELD NICKEL TUBING

Ultimate Strength	48,700 to 56,800 psi.
Yield strength	10,500 to 16,500 psi.
Elongation in 2"	57 to 39%
Hardness Rockwell "B"	20 to 35 B
(By conversion approximately	95 to 108 Brinell)

Nominal O.D. and Wall Thickness	lbs./ft.	ft./lbs.	Approx. Ultimate Bursting Strength psi.
3/16" x .028"	.054	18.49	15,800
1/4" x .028"	.075	13.29	11,800
5/16" x .028"	.097	10.38	9,450
3/8" x .028"	.118	8.50	7,880
7/16" x .028"	.139	7.20	6,750
1/2" x .028"	.160	6.25	5,900
5/8" x .028"	.202	4.95	4,700

TABLE II
PROPERTIES OF BUNDYWELD MONEL TUBING

Ultimate Strength	65,000 to 80,000 psi.
Yield Strength	24,000 to 34,000 psi.
Elongation in 2"	47 to 38%
Hardness Rockwell "B"	50 to 60 B
(By conversion approximately	50 to 60 Brinell)

Nominal O.D. and Wall Thickness	lbs./ft.	ft./lbs.	Approx. Ultimate Bursting Strength psi.
1/8" x .028"	.033	30.3	23,000
3/16" x .028"	.054	18.5	18,500
1/4" x .028"	.075	13.4	15,000
5/16" x .028"	.096	10.4	12,000
3/8" x .028"	.117	8.5	10,000
7/16" x .028"	.138	7.2	8,500
1/2" x .028"	.159	6.3	7,500
5/8" x .028"	.201	5.0	6,000

nickel, leaving the completed tube with the characteristic finish of the parent metal. Both the bonding and the cooling are carried out in a reducing atmosphere so that the tube remains clean and free from scale or other products of oxidation inside and out. Diffusion of the bonding metal coating into the base metal also increases the strength of the interlocking bond which cannot be separated at temperatures less than 2370 to 2460° F.

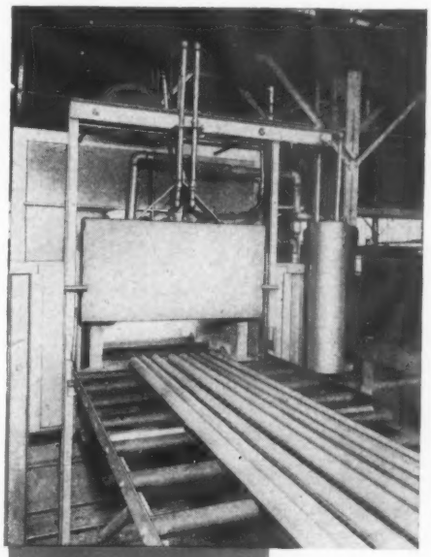
The tubing can be bent, coiled, flanged, flattened, upset, expanded or swaged. Where joints and fittings are required, it can be readily brazed to form strong bonds. When sleeves and tubes are joined by silver alloy brazing, snug joints can be formed, because of the dimensional accuracy resulting from precision production methods.

TWO NEW DEVELOPMENTS

OFFERED TO INDUSTRIAL FURNACE USERS:

1: *Refractory Radiant Heating Tubes*

2: *Refractory Hearth Rollers*



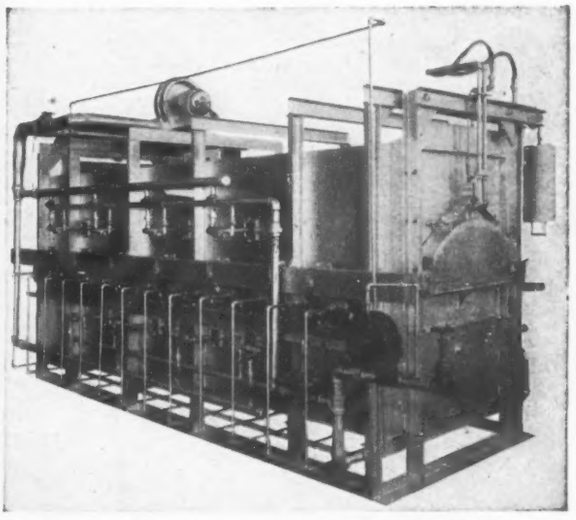
Research has developed CARBOFRAX* rollers and CARBOFRAX combustion tubes for high temperature radiant heated roller hearth type industrial furnaces. Refractory rollers and tubes engineered in GASMACO furnaces insure long-lived equipment in the higher temperature heat treating field.

2500° operating temperatures may be obtained without detrimental effect to the refractory tubes and rollers. Heavier roller loading can be attained and still convey the work through the furnace by batch, by indexing, or continuously. Investigate these developments for solution to your high temperature heating problems. Write, phone or wire for full particulars.

DESIGNERS & FABRICATORS of ALL TYPES of INDUSTRIAL HEATING & HANDLING EQUIPMENT

PATENTS APPLIED FOR

*Note: CARBOFRAX is a registered trade mark which indicates manufacture by the Carborundum Co.



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CLEVELAND 10, OHIO

The Business Trend

Outlook Brightened by High Steel Production

HIGH PRODUCTION of steel ingots is a heartening feature of current industrial activity, for it presages high level operations, at least for the near term, in other industries dependent on steel supplies.

Current steel ingot output at around 91 per cent of capacity is in decided contrast with the rate of 5 per cent a year ago during the steel strike January-February.

The current high rate of steel ingot output is responsible to a large degree for the high level of STEEL's industrial production index, which for the week ended Jan. 18 was at 153 per cent (preliminary) of the 1936-1939 average of 100. This is a 5-point increase over the 148 per cent (revised) of the week ended Jan. 11.

AUTOS—The industrial production index would be higher if automobile output had swung back to the 96,000 per week level that was attained in mid-December. However, taking of inventories and changing over of models held assemblies down to 77,034 passenger cars, trucks and busses in the week ended Jan. 18.

ELECTRICITY—Distribution of electricity continues to exhibit strength, output in the week ended Jan. 18 amounting to 4,856,890,000 kilowatt-hours. In each of the first three weeks of 1947 electricity production has exceeded that of the corresponding weeks in 1946 and 1945.

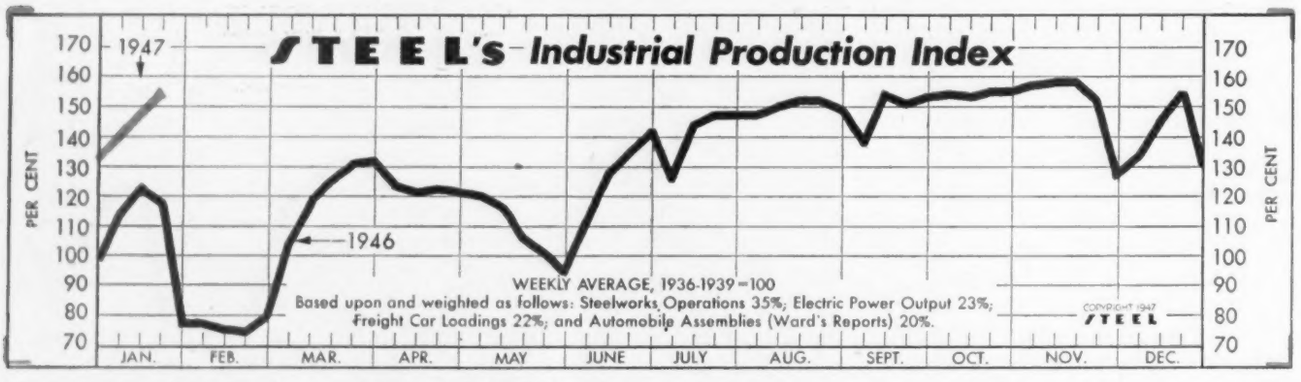
COAL—High level production of bituminous coal has been resumed, with output in the week ended Jan. 11 estimated at 13,700,000 tons, around 400,000 tons better than the highest weekly level of 1946.

PRICES—After declining for two consecutive weeks, the U. S. Bureau of Labor Statistics wholesale price index jumped 0.6 per cent to a new peak in the week ended Jan. 11 in response to upward price adjustments in commodity groups other than farm products and foods. Now at 140 per cent of the 1926 average of 100, the index is 0.1 per cent above the previous peak reached three weeks ago and 31.2 per cent above a year ago.

MONEY—Marking the third consecutive week in which a contraction of more than $200 million has occurred, money in circulation in the week ended Jan. 15 declined $230 million. While it is normal for circulation to decline at this time of year, the current rate of decrease, said the Federal Reserve Board, is considerably more than in the like period last year.

STOCKS—The Federal Reserve Board's action to permit, beginning Feb. 1, the purchase of listed stocks on a 75 per cent margin gratified Wall Street, which believes the result will be a step-up in trading. The Reserve Board's action indicates the belief inflation has largely run its course.

FREIGHT—Despite high level carloadings in the last half of the year, the volume of freight traffic handled by class I railroads in 1946, measured in ton-miles of revenue freight, dropped 13 per cent under that of 1945. The 1946 estimated volume was 590,500,000,000 ton-miles, compared with 681,000,757,000 in 1945.



The Index (see chart above): Latest Week (preliminary) 153 Previous Week 148 Month Ago 155 Year Ago 117

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	91	90	85	70
Electric Power Distributed (million kilowatt hours)	4,857	4,853	4,940	4,145
Bituminous Coal Production (daily av.—1000 tons)	2,283	1,891	2,203	1,933
Petroleum Production (daily av.—1000 bbls.)	4,624	4,531	4,708	4,606
Construction Volume (ENR—Unit $1,000,000)	$110.2	$90.4	$86.2	$45.4
Automobile and Truck Output (Ward's—number units)	77,034	64,828	96,754	28,465

* Dates on request. † 1946 weekly capacity was 1,762,381 net tons.

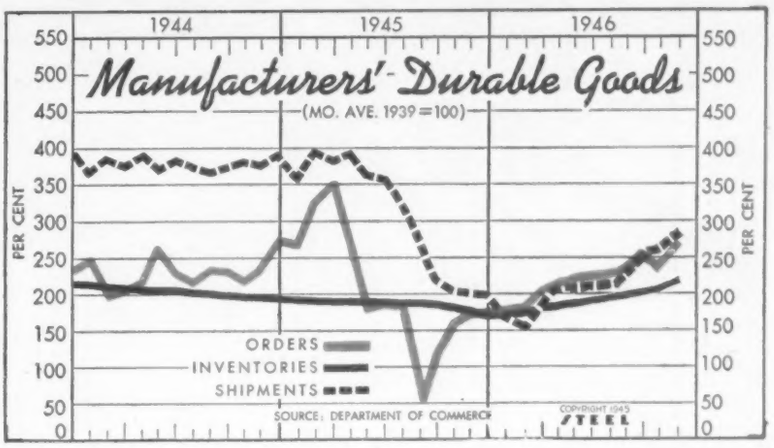
TRADE				
Freight Carloadings (unit—1000 cars)	850†	831	836	749
Business Failures (Dun & Bradstreet, number)	51	37	27	20
Money in Circulation (in millions of dollars)‡	$28,518	$28,748	$29,019	$28,119
Department Store Sales (change from like wk. a yr. ago)†	+24%	+38%	+20%	+13%

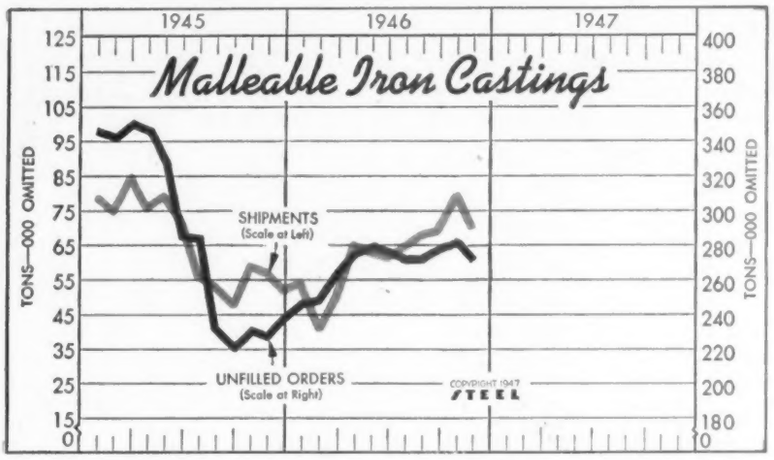
† Preliminary. ‡ Federal Reserve Board.

Index of Manufacturers' Durable Goods

(Mo. Ave. 1939 = 100)

	Orders		Shipments		Inventories	
	1946	1945	1946	1945	1946	1945
Jan.	176	267	169	354	171	190
Feb.	179	326	153	394	174	189
Mar.	203	351	183	382	181	189
Apr.	219	267	203	389	182	189
May	224	177	207	361	184	189
June	231	182	212	356	189	189
July	229	179	216	320	195	187
Aug.	232	53	233	262	200	185
Sept.	254	121	259	216	206	185
Oct.	249	160	263	203	212	182
Nov.	258	171	280	200	217	177
Dec.	...	172	...	199	...	171
Ave.	...	202	...	303	...	185





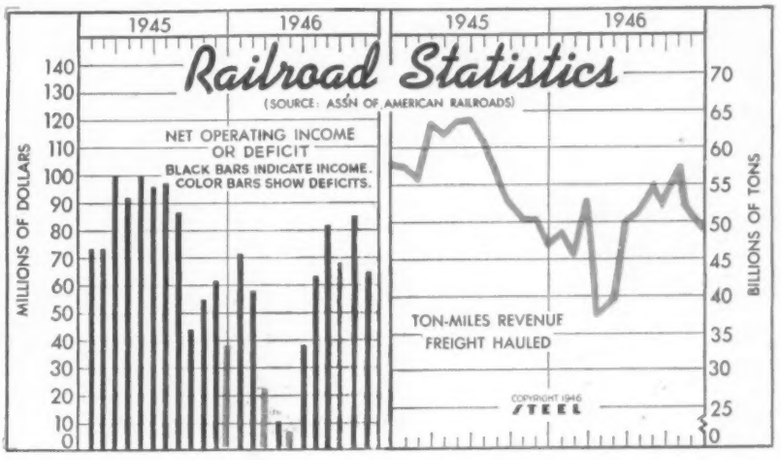
Malleable Iron Castings

	Shipments (000 omitted)		Unfilled orders for castings for sale (000 omitted)	
	1946	1945	1946	1945
Jan.	53.7	78.8	246	345
Feb.	40.2	75.2	248	342
Mar.	50.2	85.3	263	350
Apr.	65.0	76.1	275	346
May	62.6	79.6	279	328
June	61.6	72.0	276	285
July	64.4	55.8	272	284
Aug.	67.9	52.6	272	232
Sept.	69.5	47.0	277	220
Oct.	79.2	59.1	281	230
Nov.	69.0	57.3	276	227
Dec.	...	52.0	...	237

Statistics of Class I Railroads

	Net Operating Income —millions—			Tons-Miles Revenue Freight —billions—		
	1946	1945	1944	1946	1945	1944
Jan.	$70.8	$73.0	$84.9	48.2	56.8	60.5
Feb.	57.8	73.2	84.5	45.1	55.3	59.3
Mar.	*20.5	99.9	92.5	52.8	62.9	62.7
Apr.	10.1	91.9	87.7	37.0	61.6	60.4
May	* 4.8	99.9	98.5	39.0	63.4	64.0
June	38.1	96.1	99.8	50.0	63.6	62.0
July	62.8	97.1	98.6	51.5	60.5	62.8
Aug.	81.7	86.7	101.4	55.0	56.4	64.5
Sept.	67.4	44.0	89.1	52.7	52.2	61.0
Oct.	85.1	54.4	97.3	57.0	50.0	63.5
Nov.	64.1	61.3	91.6	51.5	50.0	59.4
Dec.	...	*36.9	69.8	48.5	46.5	57.3
Ave.	...	$70.0	$91.3	49.0	56.5	61.5

* Deficit.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,098	$14,072	$15,872	$12,758
Federal Gross Debt (billions)	$259.5	$259.3	$259.0	$278.0
Bond Volume, NYSE (millions)	$26.7	$27.1	$28.6	$51.7
Stocks Sales, NYSE (thousands)	5,896	5,146	6,973	14,668
Loans and Investments (billions)†	$55.6	$56.2	$57.6	$67.8
United States Gov't. Obligations Held (millions)†	$35,802	$36,029	$37,572	$49,133

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$69.36	$69.14	$64.91	$58.27
All Commodities†	140.0	139.1	139.7	106.7
Industrial Raw Materials†	153.1	153.1	154.3	119.0
Manufactured Products†	135.4	134.1	134.8	102.8

† Bureau of Labor Statistics Index, 1926=100.

BALDWIN HYDRAULIC PRESS DESIGNS ARE BASED ON EXPERIENCE

One of the more important benefits that goes with the purchase of a given product is the manufacturing experience of the producer.

In the hydraulic press field Baldwin's Southwark experience is synonymous with the field itself. This vast storehouse of knowledge and the fact that Baldwin has been a user of hydraulic presses in its own manufacturing operations for almost half a century, are all reflected in the Baldwin Southwark press you buy.

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Balancing of Steel Supply And Demand Still Months Off

Quotas on most products will be slightly more liberal for second quarter as production attains high rate . . . Most sheet and strip grades will remain tight throughout year

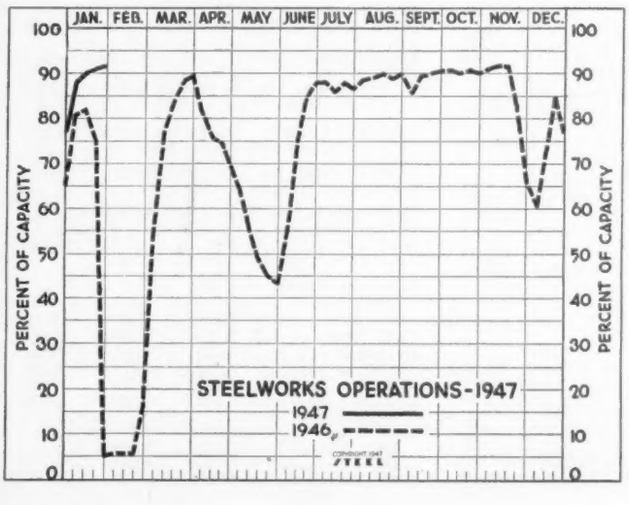
ALTHOUGH steel production has increased to the highest level attained since the war and is headed toward new postwar peaks, prospects are that a balancing of supply and demand is still some months off. Late second quarter may see a balancing in some lines, but in flat rolled products, including plates, the outlook is for an excess in requirements for some time beyond that.

Some leaders in the industry anticipate that it will be next year before there will be completely satisfactory balance in most grades of sheets and strip. Only in alloys and certain specialties is supply adequate and that has been true in alloys since before the end of the war.

By virtue of rigid rationing and various revisions in selling quotas, some producers of major products expect to be fairly well caught up on arrearages by the end of this quarter, however, and practically all of them will be in much better position in this respect than at the beginning of the present period, barring, of course, further labor disturbances, a point on which industry now is optimistic.

Producers, selling on a quarterly quota basis, have begun to set allotments on certain products for the next period, and indications are that action will become fairly general in the early future. Due to current efforts to get caught up on arrearages, it is believed that quotas on most products will be somewhat more liberal, although far below demands.

Meanwhile, pricing policies continue in a state of flux, as various producers, prodded by the recent increases in freight rates, move more conservatively on the quoting of shipments for delivery distant from producing plants. Revisions in prices still remain to be announced on a few scattered products. Last week, the leading producer increased the price base and applicable extras on electrical sheets. Other sellers are expected to take similar action this week. Adjustments are still being made in scrap price schedules, but as a whole the market has become fairly well stabilized at the highest level in many years.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Jan. 25	Change	Same Week 1946	Same Week 1945
Pittsburgh	99	None	1.5	86
Chicago	90	None	4.5	97.5
Eastern Pa.	87	+ 2	4	94
Youngstown	88	+ 3	0	85
Wheeling	89	None	56	92.5
Cleveland	92	+ 1.5	0	86.5
Buffalo	90.5	None	0	81.5
Birmingham	99	None	0	90
New England	82	+ 2	10	92
Cincinnati	91	+ 6	44	92
St. Louis	60.5	—12	14	75
Detroit	90	— 3	31	90
Estimated national rate	91.5	+ 0.5	5	93.5

Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

The first serious interruption to production schedules in the steel industry this year occurred last week when a severe cold wave created a gas shortage in several leading steel producing and consuming centers. Shutdowns were particularly widespread in Pennsylvania and Ohio and lasted slightly over 48 hours. Five rolling mills of the Carnegie-Illinois Steel Corp. were down while three open hearths, and the No. 3 rod mills were down at the American Steel & Wire Co.'s Donora plant. The latter company's operations in Cleveland were also affected where the patenting, normalizing and three stainless steel annealing furnaces and the No. 2 coarse rod mill were down at the Cuyahoga works, reducing output at that plant to 50 per cent of capacity. At the American Works, the annealing and brass plating departments were down. Ohio plants of Jones and Laughlin and Republic Steel Corp. were also affected slightly. Allegheny-Ludlum Steel Corp. closed its West Leechburg plant and curtailed operations at its Brackenridge plant.

Steel operations were affected in only a few isolated instances, the estimated national rate having risen one-half point further to 91.5 per cent of capacity, equaling the postwar high established last fall. Operations rose 6 points to 91 per cent in Cincinnati, 3 points to 88 per cent in Youngstown, 2 points to 87 per cent in eastern Pennsylvania, 2 points to 82 per cent in New England, and 1½ points to 92 per cent in Cleveland. Operations dropped 12 points in St. Louis to 60.5 per cent and eased 3 points to 90 per cent in Detroit.

STEEL's composite price averages held unchanged at $69.36 for finished steel, $52.10 for semifinished, $29.56 for basic pig iron, and $31.17 for steelmaking scrap.

COMPOSITE MARKET AVERAGES

	Jan. 25	Jan. 18	Jan. 11	One Month Ago Dec., 1946	Three Months Ago Oct., 1946	One Year Ago Jan., 1946	Five Years Ago Jan., 1942
Finished Steel	$69.36	$69.36	$69.14	$64.75	$64.45	$58.27	$56.73
Semifinished Steel	52.10	52.10	51.00	41.10	40.60	37.80	36.00
Steelmaking Pig Iron	29.56	29.56	29.56	29.10	27.50	24.75	23.00
Stelmaking Scrap	31.17	31.17	31.17	27.68	19.17	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. **Semifinished Steel Composite:**—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. **Steelmaking Pig Iron Composite:**—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago Cleveland, Neville Island, Granite City and Youngstown. **Steelworks Scrap Composite:**—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	Jan. 25, 1947	Dec., 1946	Oct., 1946	Jan., 1946
Steel bars, Pittsburgh	2.60c	2.55c	2.50c	2.25c
Steel bars, Philadelphia	2.98	2.91	2.86	2.57
Steel bars, Chicago	2.60	2.55	2.50	2.25
Shapes, Pittsburgh	2.50	2.35	2.35	2.10
Shapes, Philadelphia	2.64	2.48	2.48	2.215
Shapes, Chicago	2.50	2.35	2.35	2.10
Plates, Pittsburgh	2.65	2.50	2.50	2.25
Plates, Philadelphia	2.85	2.558	2.558	2.30
Plates, Chicago	2.65	2.50	2.50	2.25
Sheets, hot-rolled, Pittsburgh	2.50	2.48	2.425	2.20
Sheets, cold-rolled, Pittsburgh	3.20	3.19	3.275	3.05
Sheets, No. 10 galv., Pittsburgh	3.55	3.675	†4.05	†3.70
Sheets, hot-rolled, Gary	2.50	2.481	†2.425	†2.20
Sheets, cold-rolled, Gary	3.20	3.218	3.275	3.05
Sheets, No. 10 galv., Gary	3.55	3.675	†4.05	†3.70
Hot-rolled strip, Pittsburgh	2.50	2.462	2.35	2.10
Cold-rolled strip, Pittsburgh	3.20	3.162	3.05	2.80
Bright basic, bess, wire, Pittsburgh	3.425	3.05	3.05	2.75
Wire nails, Pittsburgh	4.125	3.75	3.75	2.90
Tin plate, per base box, Pittsburgh	$5.75	*$5.25	*$5.25	$5.00

* Nominal. † Base changed in December to 10 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$58.00	$38.00	$38.00	$36.00
Slabs, Pittsburgh, Chicago	51.00	39.00	39.00	36.00
Rerolling billets, Pittsburgh	51.00	39.00	39.00	36.00
Wire rods ¼ to $\frac{7}{32}$-inch, Pitts.	2.675c	2.425c	†2.30c	†2.15c

† Base changed in December.

Pig Iron

	Jan. 25, 1947	Dec., 1946	Oct., 1946	Jan., 1946
Bessemer, del. Pittsburgh	$31.83	$31.77	$29.77	$26.94
Basic, Valley	30.00	29.50	28.00	25.25
Basic, eastern del. Philadelphia	32.01	31.93	29.93	27.09
No. 2 fdry., del. Pgh. N. & S. sides	31.33	31.27	29.27	28.44
No. 2 fdry., del. Philadelphia	32.51	30.43	30.43	27.59
No. 2 foundry, Chicago	30.50	30.00	28.50	25.75
Southern No. 2, Birmingham	26.88	26.88	24.88	22.13
Southern No. 2, del. Cincinnati	31.75	30.94	28.94	26.05
Malleable, Valley	30.50	30.00	28.50	25.75
Malleable, Chicago	30.50	30.00	28.50	25.75
Charcoal, low phos., fob Lyles, Tenn.	37.50	37.50	33.00	33.00
Gray forge, del. McKees Rocks, Pa.	30.66	30.61	28.61	25.80
Ferromanganese, fob cars, Pittsburgh	140.00	140.00	140.00	140.00

Scrap

Heavy melting steel, No. 1, Pittsburgh	$32.50	$28.50	$20.00	$20.00
Heavy melt, steel, No. 2, E. Pa.	31.00	27.38	18.75	18.75
Heavy melting steel, Chicago	30.00	27.188	18.75	18.75
Rails for rolling, Chicago	38.50	31.00	22.25	22.25
No. 1 cast, Chicago	42.50	36.875	25.00	20.00

Coke

Connellsville, furnace ovens	$8.875	$8.75	$8.75	$7.50
Connellsville, foundry ovens	9.875	9.50	9.50	8.25
Chicago, by-product fdry., del.	*16.10	15.288	15.10	13.75

* Plus Jan. 1 freight rate increase.

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Copperweld Steel Co., electric furnace melted carbon ingots, $55-$60, Warren, O. Forging quality, $40, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, Coatesville, uncrop, $52.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $42; Portsmouth Steel Corp., $55-$60, Portsmouth, O. Detroit, del., $44.50; Pac. ports (billets), $51.50.

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $50; Detroit, del., $52.50.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $61; del. Detroit $63.50; eastern Mich. $64.50.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $50; Portsmouth Steel Corp., $66 Portsmouth, O.

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb 2.35c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, ¼ to $\frac{7}{32}$-in., inclusive, $2.55-$2.80 per 100 lb. Galveston base, $2.65. Worcester, add $0.10.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base, 20 tons one size, 2.60c; Duluth, base, 2.60c; Detroit, del., 2.735c; eastern Mich., 2.785c; New York, del., 3.01c; Phila., del., 2.98c.

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.05c; Detroit, del., 3.185c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.20c; Detroit, 3.25c; Toledo, 3.3c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.80c; Detroit, del., 3.935c; eastern Mich., 3.985c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.45c; Detroit, del., 2.585c; eastern Mich. and Toledo, 2.635c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.45c; Detroit, del., 2.585c; eastern Mich. and Toledo, del., 2.635c.

Iron Bars: Single refined, Pitts., 6.15c; double refined, 7.00c; Pittsburgh, staybolt, 7.85c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 2.50c; Detroit, del., 2.635c; eastern Mich., del., 2.685c; Philadelphia, del., 2.70c; New York, del., 2.79c.

(Andrews Steel Co. quotes on Middletown, O., base for shipment to Detroit area; Alan Wood Steel Co., Conshohocken, Pa., quotes 3.25c, Sparrows Point Md., base; Granite City Steel Co., 2.875c, fob Granite City, Ill., 2.775c, fob Gary or Birmingham.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.20c; Granite City, base, 3.30c; Detroit, del., 3.335c; eastern Mich., del., 3.385c; New York, del., 3.61c; Philadelphia, del., 3.58c.

Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Middletown, base 3.55c; New York, del., 3.84c; Philadelphia, del., 3.75c.

Corrugated Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, base, 3.55c.

Culvert Sheets, No. 16, not corrugated, copper alloy: Pittsburgh, Chicago, Gary, Birmingham, 4.15c; Granite City, 4.25c; copper iron 4.50c; pure iron, 4.50c.

Aluminized Sheets, No. 20 hot-dipped, coils or cut to lengths: Pittsburgh, 9.00c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.55c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.55c; Granite City, base, 3.65c; Detroit, del., 3.685c; eastern Mich., 3.735c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.90c	4.685c	4.00c
Armature	4.25c	5.035c	4.35c
Electrical	4.75c	5.535c	4.85c
Motor	5.425c	6.21c	5.525c
Dynamo	6.125c	6.91c	6.225c
Transformer			
72	6.625c	7.41c	....
65	7.625c	8.41c	....
58	8.125c	8.91c	....
52	8.925c	9.71c	....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 2.50c; Detroit, del., 2.635c; eastern Mich., del., 2.685c. (Superior Steel Corp., 3.30c, Pittsburgh).

Cold-Rolled Strip, 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.20c; Chicago, base, 3.30c; Detroit, del., 3.335c; eastern Mich., 3.385c; Wooster, base, 3.40c. (Superior Steel Corp., 4.70c, Pittsburgh.)

Cold-Finished Spring Steel, 0.26-0.50 carbon: Pittsburgh, Cleveland, base, 3.03c; add 0.20c for Worcester.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.60c; Granite City, Birmingham, Sparrows Point, 3.50c; Pacific ports, boxed 4.435c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-base box, $4.90; Granite City, Birmingham, Sparrows Point, $5.00.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb $13.50; 15-lb $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.65c; Coatesville, Claymont, Geneva, Utah, 2.80c; New York, del. 2.94c; Phila., del., 2.85c; St. Louis, del., 2.74c; Boston, del., 2.86c.
(Central Iron & Steel Co., Harrisburg, Pa., 3.40c, basing points; Alan Wood Steel Co., Conshohocken, Pa., 2.80c, Coatesville and Claymont equivalent.)

Floor Plates: Pittsburgh, Chicago, 3.90c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.787c; Coatesville, 4.15c.

Clad Steel Plates: Coatesville, 10% cladding: nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.50c; Geneva, Utah, 2.65c; New York, del., 2.70c; Phila., del., 2.64c.
(Phoenix Iron Co., Phoenixville, Pa., nominally, 3.05c, Bethlehem, Pa., equivalent.)

Steel Piling: Pittsburgh, Chicago, Buffalo, $3 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads
Bright, basic or bessemer.....*$3.30-$3.55
Spring (except Birmingham)..... **$4.25

Wire Products to Trade
Nails and Staples
Standard and cement-coated.....†$3.75-$4.50
Galvanized .....‡$3.75-$4.50

Wire, Merchant Quality
Annealed (6 to 8 base)..... §$3.95
Galvanized (6 to 8 base)..... §$4.40
(Fob Pittsburgh, Chicago, Cleveland, Birmingham, per base column)
Woven fence, 15 gage and heavier..... 84
Barbed wire, 80-rod spool..... 94
Barbless wire, twisted 94
Fence posts ..... ††82
Bale ties, single loop..... 86

* Add $0.10 for Worcester, $0.05 for Duluth and $0.535 for Pacific ports.
** Add $0.10 for Worcester, $0.25 for Duluth and Trenton, N. J., $0.535 for Pacific ports.
† Add $0.30, Worcester, $0.535, Pacific ports.
‡ Add $0.535 for Pacific ports.
§ Add $0.10, Worcester; $0.735, Pacific ports.
†† Add 2 for Duluth.

Rails, Supplies

Rails: Standard, over 60-lb. fob mill, $2.50 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $2.85 per 100 lb.

Relaying, $35 lb and over, fob railroad and basing points, $31-$33 per net ton.

Supplies: Track bolts, 6.50c; heat treated, 6.75c. Tie plates, $2.80 per 100 lb, fob mill. Splice bars, $3 per 100 lb. Standard spikes, 3.65c-4.50c; screw spikes, 5.30c-6.40c.

Tubular Goods

Standard Pipe: Base price in carloads, threaded and coupled, to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind., 2 points less on lap weld and 1 point less on butt weld on sizes produced in that district. Pittsburgh base only on wrought iron pipe.

Butt Weld

	Steel		Iron		
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	48	23	¼	— 2	+20
¼ & ⅜	51	30½	⅜	—11½	+10
½	55½	41	1-1¼	—17	+ 2
¾	58½	45	1½	—22½	— 1½
1-3	60½	47½	2	—23	— 2

Lap Weld

	Steel		Iron		
In.	Blk.	Gal.	In.	Blk.	Gal.
			1¼	— 1	+20
2	53	39½	1½	— 7	+13
2½-3	56	42½	2	—14½	+ 5½
3½-6	58	44½	2½-3½	—17	+ 1½
*8	58	42½	4	—21	— 4
*10	57½	42	4½-8	—19	— 2½
*12	56½	41	9-12	—10	+ 7

* Not T. & C.

Seamless
Steel

In.	Blk.	Gal.	In.	Blk.	Gal.
2	52	38½	*8	57	42
2½-3	55	41½	*10	56¼	42
3½-6	57	43½	*12	55½	41

* Not T. & C.

Line Pipe

In.	Seamless	In.	Butt Weld
2	51	⅛	47
2½ & 3	54	¼ & ⅜	50
3½ to 8	56	½	54½
10	55½	¾	57½
12	54½	1 to 3	59½

Boiler Tubes: Net base prices per 100 feet, fob Pittsburgh, in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

		——Seamless——		—Elec. Weld—	
O.D.		Hot	Cold	Hot	Cold
Sizes	B.W.G.	Rolled	Drawn	Rolled	Drawn
1"	13	....	$10.89	$10.62	$10.62
1¼"	13	....	12.90	10.59	12.58
1½"	13	$12.00	14.26	11.70	13.90
1¾"	13	13.65	16.23	13.31	15.82
2"	13	15.29	18.17	15.00	17.95
2¼"	13	17.05	20.26	16.71	20.00
2¼"	12	18.78	22.31	18.38	22.00
2½"	12	20.57	24.43	20.11	24.07
2⅝"	12	21.80	25.89	21.27	25.46
3"	12	22.87	27.18	22.26	26.68
3⅛"	11	26.88	31.94	26.15	31.33
3½"	11	28.86	34.30	28.06	33.64
4"	10	35.82	42.55	34.78	41.68
4½"	9	47.48	56.42	....	....
5"	9	54.96	65.30	....	....
6"	7	84.38	100.25	....	....

Pipe, Cast Iron: Class B, 6-in. and over, $65 per net ton, Birmingham; $70, Burlington, N. J.; $75.56, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine

½-in. and smaller; up to 6 in. in length	55 off
⅝ and ⅝, up to 6 in. in length	52 off
¾ x 6 in.	49 off
⅞ and 1 in. x 6 in. length	51 off
1⅛ in. and larger in all lengths and ⅞ in. and larger in lengths over 6 in.	48 off
⅛ in. and smaller, longer than 6 in.	45 off
Tire bolts	38½ off
Step bolts	46 off
Plow bolts	57 off

Stove Bolts
In packages, nuts separate, 60-10 off; bulk 74 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

	A.S. Light	A. S. Reg. and Heavy
Semifinished hexagon		
⅞-in. and smaller	51 off	....
½-in. and smaller	....	48 off
½-in.-1-in.	48 off	....
⅝-in.-1-in.	....	47 off
1⅛-in.-1½-in.	46 off	45 off
1⅝-in. and larger	....	44 off

Additional discount of 15 for full containers.

Hexagon Cap Screws

Upset 1-in., smaller (10-20 bright)	56 off
Upset (10-35 heat treated)	
⅝ x 6	51 off
¾, ⅞ & 1 x 6	47 off

Square Head Set Screws

Upset 1-in. and smaller	61 off
Headless, ¼-in. and larger	46 off
No. 10 and smaller	56 off

Rivets

Fob Pittsburgh, Cleveland, Chicago Birmingham, Lebanon, Pa.

Structural	5.25c
⅞-inch and under	55-5 off

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl .....$1.50-$2.00 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

W	Cr	V	Mo	Base, per lb
18.00	4	1	...	72.49c
1.5	4	1	8.5	58.43c
....	4	2	3	58.43c
6.40	4.15	1.90	5	62.22c
5.50	4.50	4	4.50	75.74c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plates	Sheets	Hot Rolled Strip	Cold Rolled Strip
	CHROMIUM NICKEL STEELS				
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	57.50	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	39.50
	STRAIGHT CHROMIUM STEEL				
403	23.50	27.00	32.00	23.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442	24.50	28.00	35.50	26.00	35.00
443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
*501	9.00	13.00	17.50	13.00	18.50
*502	10.00	14.50	18.50	14.50	19.50
	‡STAINLESS CLAD STEEL (20%)				
304	....	....	24.00	22.00	....	....
410	....	....	22.00	20.00	....	....
430	....	....	22.50	20.50	....	....
446	....	....	29.00	27.00	....	....

* Low chromium. ‡ Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

Metallurgical Coke

Price Per Net Ton
Beehive Ovens

Connellsville, furnace	*$8.75-$9.00
Connellsville, foundry	9.75-10.00
New River, foundry	11.75
Wise county, foundry	9.00- 9.50
Wise county, furnace	8.50- 9.00

* Operators of hand-drawn ovens using trucked coal, $9.35-$9.60.

Coke By-Products

Spot, gal, freight allowed east of Omaha.

Pure and 90% benzol	15.00c
Toluol, two degree	22.00c
Industrial xylol	22.00c
Solvent naphtha	26.00c
Per pound fob works	
Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c
Eastern plants, per pound	
Naphthalene flakes, balls, bbl, to jobbers, "household use"	9.00c
Per ton, bulk, fob plants	
Sulphate of ammonia	$30.00

PIG IRON

Prices per gross ton. Minimum delivered prices do not include 3 per cent federal tax.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$31.50	$31.00	$32.50	$32.00
Newark, N. J., del.	33.34	32.84	34.34	33.84
Brooklyn, N. Y., del.	34.50 *	....	....	35.00
Birdsboro, Pa., base	31.50	31.00	32.50	32.00
Birmingham, base	26.88	25.50	31.50	....
Baltimore, del.	33.28	....	....	....
Boston, del.	*31.62	....	....	....
Chicago, del.	*30.72	....	....	....
Cincinnati, del.	31.75	30.37	....	....
Newark, N. J., del.	32.96	....	....	....
Philadelphia, del.	32.13	31.63	....	....
St. Louis, del.	*30.62	*31.54	....	....
Buffalo, base	30.50	30.00	31.50	31.00
Boston, del.	36.98	36.48	37.98	37.48
Rochester, del.	32.34	31.84	33.34	32.84
Syracuse, del.	33.00	32.50	34.00	33.50
Chicago, base	30.50	30.00	31.00	30.50
Milwaukee, del.	31.82	31.32	32.32	31.82
Muskegon, Mich., del.	34.33	....	....	34.33
Cleveland, fob furnace	30.50	30.00	31.00	30.50
Akron, Canton, del.	32.17	31.67	32.67	32.17
Detroit, base	30.50	30.00	31.00	30.50
Saginaw, Mich., del.	33.67	33.17	34.17	33.67
Duluth, base	31.00	30.50	31.50	31.00
St. Paul, del.	*33.13	*32.63	*33.63	*33.13
Erie, Pa., base	30.50	30.00	31.50	31.00
Everett, Mass., base	29.50	29.00	30.50	30.00
Boston, del.	30.00	29.50	31.00	30.50
Granite City, Ill., base	30.50	30.00	31.00	30.50
St. Louis, del.	31.25	30.75	....	31.25
Neville Island, Pa., base	30.50	30.00	31.00	30.50
†Pittsburgh, del., N.&S. sides	31.33	30.83	31.83	31.33
Provo, Utah, base	28.50	28.00	....	....
Sharpsville, Pa., base	30.50	30.00	31.00	30.50
Steelton, Pa., base	31.50	31.00	32.50	32.00
Swedeland, Pa., base	31.50	31.00	32.50	32.00
Philadelphia, del.	32.51	32.01	....	33.01
Toledo, O., base	30.50	30.00	34.50	34.00
Cincinnati, del.	34.00	33.50	....	....
Youngstown, O., base	30.50	30.00	31.00	30.50
Mansfield, O., del.	33.48	32.98	33.98	33.48

* Plus Jan 1 freight rate increase.

† To Neville Island base add: 66c for McKees Rocks, Pa.; $1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.33, Oakmont, Verona; $1.49 Brackenridge.

Exceptions to above prices: Kaiser-Frazer Parts Corp., Struthers, O., charges 50 cents a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable pig iron.

High Silicon Silvery

6.00-6.50 per cent (base).....$36.00

6.51-7.00	$37.00	9.01- 9.50	42.00
7.01-7.50	38.00	9.51-10.00	43.00
7.51-8.00	39.00	10.01-10.50	44.00
8.01-8.50	40.00	10.51-11.00	45.00
8.51-9.00	41.00	11.01-11.50	46.00

Fob Jackson, O., per gross ton. Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Electric Furnace Ferrosilicon: Si 14.01-14.50%, $52.75, Jackson, O.; $56 Keokuk, Iowa; $54, Buffalo and Niagara Falls, N. Y. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn. $37.50 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $30.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., Birdsboro, Pa., $36, base; Philadelphia, $37.49, del. Intermediate phosphorus, Central furnace, Cleveland, $33.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge not to exceed 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge not to exceed 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Refractories

Per 1000, fob shipping point
Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $81.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	65.00
Ala., Ga.	65.00
N. J.	70.00

Intermediate Heat Duty

Ohio	57.00
Pa., Ill., Md., Mo., Ky.	59.00
Ala., Ga.	51.00
N. J.	62.00

Low Heat Duty

Pa., Md., Ohio 51.00

Malleable Bung Brick

All bases 75.00

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	42.00
Wire Cut	40.00

Silica Brick

Pennsylvania	65.00
Joliet, E. Chicago	74.00
Birmingham, Ala.	65.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	22.00
Bags	26.00

Basic Brick

Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

ORES

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.45
Old range nonbessemer	5.30
Mesabi bessemer	5.20
Mesabi nonbessemer	5.05
High phosphorus	5.05

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

Foreign Ore

Cents per unit, cif Atlantic ports

Manganiferrous ore, 45-55% Fe., 6-10% Mn.	Nom.
N. African low phos.	Nom.
Swedish basic, 60 to 68%	13.00
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro	7.50–8.00

Tungsten Ore

Chinese Wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.
(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27-$27.50
45% no ratio	28.00
48% no ratio	30.00
50% no ratio	31.00

Brazilian—nominal

44% 2.5:1 lump	**$33.65**
48% 3:1 lump	**43.50**

Rhodesian

45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00

Domestic (seller's nearest rail)

48% 3:1	$39.00

Manganese Ore

Sales prices of Office of Metals Reserve, cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91c; prices include duty on imported ore and are subject to established premiums, penalties and other provisions. Price at basing points which are also points of discharge of imported manganese ore is fob cars, shipside, at dock most favorable to the buyer. Outside shipments direct to consumers at 15c per unit less than Metals Reserve prices.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn	Si	Cr	Ni	Mo	Basic open-hearth Electric furnaces Bars per 100 lb	Billets per GT	Bars per 100 lb	Billets per GT
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	$0.812	$16.230	$1.353	$27.050
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.812	16.230	1.353	27.050
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.866	17.312	1.407	28.132
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.703	14.066	1.244	24.886
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542

Extras are in addition to a base price of 2.92½c per pound on finished products and $58.43 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

WAREHOUSE STEEL PRICES

Base prices, cents per pound, for delivery within switching limits, subject to extras

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. °10G	Gal. °24G	†H-R	C-R	H-R	C-F	H-R Alloy (ƒ4140)	Structural Shapes	Carbon ¾"-¾"	Floor ¾" & Thicker
Boston (city)	4.50	....	5.22[4]	....	6.80[4]	4.65	....	4.62	5.47	7.02	4.47	4.72	6.37
Boston (country)	3.90	....	4.60[4]	....	6.20[4]	3.95	....	4.00	4.85	6.50[11]	3.95	4.20	5.65
††New York (city)	4.42	....	5.27[5]	5.47[5]	....	4.62	....	4.62	5.42	8.42[9]	4.37	4.64	6.35
††New York (country)	4.32	....	5.17[5]	5.37[5]	....	4.52	....	4.52	4.85	....	4.27	4.54	6.25
Philadelphia (city)	4.24	....	5.33[5]	....	6.54[5]	4.43	....	4.48	5.38	6.87	4.22	4.40	5.93
Philadelphia (country)	4.14	....	5.23[5]	....	6.44[5]	4.33	....	4.38	....	6.60	4.12	4.30	5.83
Baltimore (city)	4.09	....	5.65[2]	....	6.39[5]	4.40	....	4.45	5.35	....	4.34	4.39	5.90
Buffalo (city)	4.00	....	4.70[6]	4.35[5]	....	4.30	4.95	4.05	4.95	....	4.05	4.60	5.90
Buffalo (country)	3.90	....	4.60[6]	4.95[5]	....	3.90	4.60	3.95	4.85	6.60	3.95	4.20	5.45
Pittsburgh (city)	4.00	....	4.70[5]	....	6.30[3]	4.00	....	4.05	4.95	6.15	4.05	4.30	5.55
Pittsburgh (country)	3.90	....	4.60[5]	....	6.20[3]	3.90	....	3.95	4.85	6.05	3.95	4.20	5.45
Cleveland (city)	4.00	5.15	4.70[5]	5.238[5]	6.488[5]	4.188	....	4.05	4.95	6.858	4.311	4.30	5.811
Cleveland (country)	3.90	5.05	4.60[5]	....	....	....	....	3.95	4.85	....	....	4.20	....
Cincinnati	4.116	5.266[8]	....	5.166[5]	....	4.394	....	4.403	5.303	....	4.444	4.653	5.944
Chicago (city)	4.00	....	4.70[5]	....	6.30[5]	4.00	....	4.05	4.95	6.60	4.05	4.30	5.70
Chicago (country)	3.90	....	4.60[5]	....	6.20[5]	3.90	....	3.95	4.85	6.60	3.95	4.20	5.60
Milwaukee	5.99	....	6.69[5]	....	8.29[5]	5.99	....	6.04	6.94	8.59	6.04	6.29	7.69
Indianapolis	4.04	....	4.84[11]	5.29	6.54	4.24	....	4.36††	5.26[12]	11.01	4.36	4.61	6.01
St. Paul	4.384[1]	5.534[8]	5.084[8]	5.434[5]	6.684[5]	4.404[13]	....	4.434[12]	5.726[11]	7.084[11]	4.434[13]	4.684[13]	6.084[13]
St. Louis	4.199	....	4.899[9]	....	6.674[5]	4.199	....	4.249	5.324	7.074	3.999	3.999	5.999
New Orleans	4.46°°	....	5.77[5]	....	....	4.83	....	4.78°°	6.14	....	....	....	....
Houston, Tex.	4.50[7]	....	....	6.00[10]	....	....	....	4.75[1]	....	....	....	....	....

Base Quantities: 400 to 1999 pounds except as noted: Cold-rolled strip, 2000 to 39,999 pounds; cold finished bars, 1000 pounds and over; [1]—any quantity; [2]—300 to 1999 pounds; [3]—150 to 2249 pounds; [4]—three to 24 bundles; [5]—450 to 1499 pounds; [6]—one bundle to 1499 pounds; [7]—one to nine bundles; [8]—400 to 1499 pounds; [9]—1000 to 1999 pounds; [10]—450 to 39,999 pounds; [11]—1000 to 39,999 pounds; [12]—1000 pounds and over; [13]—400 to 74,999 pounds.

° Includes gage and coating extra; † does not include gage extras; ‡ basing point cities with quotations representing mill prices plus warehouse spread; § as rolled, except New York, Jersey City and Indianapolis where price represents annealed bars; °° add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items.

Open Market Prices of Leading Ferroalloy Products

Spiegeleisen: 19-21% carlot per gross ton, Palmerton, Pa., $40; Pittsburgh, $40.50; Chicago, $40.60.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140 fob cars, Pittsburgh, including 50c switching charge, (where Carnegie - Illinois Steel Corp. is producer); add $8 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.70c; regular, 21.20c; medium, 15.20c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn) Prices per lb of briquets: Contract, carlots, bulk 6.40c, packed 6.90c, tons 7.30c, less 7.70c, eastern, freight allowed; 6.65c, 7.15c, 7.90c and 8.30c, central; 7.20c, 7.70c, 9.80c and 10.20c, western; spot up 0.25c; notched up 0.25c.

Ferrotungsten: Spot, 10,000 lb or more, per lb contained W, $1.90; contract, $1.88; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum C; per lb contained Ti; ton lots $1.35; less-ton lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High-Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C $142.50; 3-5% C $157.50.

Ferrovanadium: V 35-55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 12.95c, ton lots 13.45c, smaller lots 13.95c; 80-90%, c.l. 11.35c, ton lots 11.90c, smaller lots 12.45c; 75%, c.l. 10.15c, ton lots 10.75c, smaller lots 11.35c; 50% c.l. 8.45c, ton lots 9.10c, smaller lots 9.75c. Deduct 1.0c for bulk carlots 75%, 80-90%, 90-95%. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, ton lots $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60%, per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.50; less ton lots $2.55. Spot up 10c.

Ferrochrome: Contract, lump, packed; high carbon, eastern zone, c.l. 16.20c, ton lots 16.80c; central zone, add 0.40c and 1.30c; western zone, add 0.55c and 2.10c. Deduct 0.60c for bulk carlots.

High carbon, high nitrogen, add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c.

Low carbon, eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22c, 0.2% 21.50c, 0.5% 21c, 1% 20.50c, 2% 19.50c; add 1c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l., and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carload packed differential 0.45c. Prices are per pound of contained Cr, fob shipping points.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, 2-inch x D, packed, eastern zone, freight allowed, c.l. 17.05c, ton lots 17.60c, less than ton 18.30c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, high carbon: (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 17.30c, ton lots 17.90c, less than ton 18.60c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Prices are per pound of contained chromium, spot prices 0.25c higher. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 20.00c, packed 20.15c; ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained Cr; 20.40c, 20.50c, 20.95c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35c, ton lots 10.75c, less than ton 11.15c; central zone, add 0.25c for c.l. and 0.90c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.50c for bulk carlots. Prices per pound of briquets; spot prices 0.25c higher; notched, 0.25c higher.

Chromium Metal: 97% min. Cr, max. 0.50% C, eastern zone, per lb contained Cr bulk, c.l. 79.50c, 2000 lb to c.l. 80c; central 81c and 82.60c; western 82.25c and 84.75c, fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) Contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract, ton lot or more, $1.60; 100 to 1999 lb, $1.95; less than 100 lb, $3.15 per lb of metal, eastern zone; $1.615, $1.965 and $3.185, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si

60-65% and Fe 3.00% max.), per lb of alloy. Contract, cariot, lump 13.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 13.65c; 2000 lb to c.l., 15.05c; central zone, 14.25c and 17.30c; western; 14.85c and 19.05c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l. 13.15c, 2000 lb to c.l. 14.65c; central, 13.85c and 16.90c; western, 14.45c and 18.65c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese, containing exactly 2 lb Mn and about ⅓ lb Si eastern zone, bulk, c.l. 6.15c, ton lots 7.05c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c.

Ferrosilicon: Weighing about 5 lb and containing exactly 2 lb Si, packed, eastern zone, c.l. 4.20c, ton lots 4.60c, less than ton lots 5c; weighing about 2½ lb and containing 1 lb Si, packed, eastern zone, c.l. 4.35c, ton lots 4.75c, less 5.15c; notched 0.25c higher; central zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.50c for bulk carlots.

Manganese Metal: (Min. 96% Mn, max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central 31.00c and 33.45c; western, 31.45c and 34.40c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) Prices per lb of alloy. Contract, ton lots $1.89, less $2.01, eastern, freight allowed; $1.903 and $2.023, central; $1.935 and $2.055, western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance). Prices per lb of alloy. Contract, 5 tons or more $1.90, 1 ton to 8 tons $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si; $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c per lb; less-ton lots, 50c per lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) Prices per lb of alloy, contract, or spot carlots 35.00c, ton lots 37.00c, less 39.00c, eastern, freight allowed; 35.30c, 38.10c and 40.10c, central; 35.30c, 40.05c and 42.05c, western; spot up 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) Prices per lb of alloy, contract, carlots 12.50c, ton lots 13.25c, less 14.00c, eastern zone, freight allowed; 12.80c, 14.35c and 15.10c, central; 12.80c, 16.30c and 17.05c, western; spot up 0.25c.

CMSZ Alloy 4: (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 3.00-4.50%). Contract or spot, carlots, bulk 12.00c, packed 12.75c; ton lots 13.50c, less 14.25c, eastern zone, freight allowed; 12.30c, 13.05c, 14.60c, 15.35c, central; 12.30c, 13.05c, 16.65c, 17.30c, western.

CMSZ Alloy 5: (Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%) Prices per lb of alloy, contract or spot, carlots, bulk 11.75c, packed 12.50c, ton lots 13.25c, less 14.00c, eastern, freight allowed; 12.05c, 12.80c, 16.30c, 17.05c, western.

Zirconium Alloy: 12-15%, per lb of alloy, eastern, contract, carlots, bulk 4.85c, packed 5.30c, ton lots 5.65c, less 6.00c; spot up 0.25c.

Zirconium Alloy: Zr 35-40%, eastern, contract basis, carloads in bulk or package, per lb of alloy 14.50c, ton lots 15.75c, less 17.00c; spot up 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb 6.25c; ton lots 6.75c; less 7.25c. Spot up ½c.
Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, less-ton lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Tungsten Metal Powder: Spot, not less than 97%, $2.50-$2.60; freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5.84% NA_2O; or air dried, 83-85% V_2O_5 and 5.15% NA_2O, $1.10 per lb contained V_2O_5 fob plant freight allowed on quantities of 25 lb and over to St. Louis.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

OPEN HEARTH AND BLAST FURNACE GRADES

	—Heavy Melting—			—Bundles—							
	No. 1	No. 2	No. 1 Busheling	No. 1	No. 2	No. 3	Machine Shop Turnings	Mixed Borings, Turnings	Short Shovel Turnings	Cast Iron Borings
Pittsburgh	32.50	32.50	32.50	32.50	32.50	32.50	27.50–28.00	27.50–28.00	29.00–29.50	28.50–29.00
Philadelphia	30.50–31.50	30.50–31.50	30.50–31.50	30.50–31.50	30.50–31.50	28.50–29.00	23.50–24.00	23.50–24.00	23.50–24.00	23.50–24.00
Chicago	30.00	30.00	30.00	30.00	30.00	28.00	25.00	25.00	27.00	26.00
Cleveland	30.00–32.50	30.00–32.50	30.00–32.50	30.00–32.50	30.00–32.50	28.00–30.50	24.00–24.50	25.00–25.50	25.00–25.50	25.00–25.50
Cincinnati	29.50	29.50	28.50	29.50	29.00	....	22.50	21.00	24.00	22.50
•Boston	25.00–26.00	25.00–26.00	25.00–26.00	25.00–26.00	25.00–26.00	23.00–24.00	19.00–20.50	17.35–17.85	21.00–22.50	17.35
‡New York	28.00–23.50	28.00–28.50	28.00–28.50	28.00–28.50	28.00–28.50	26.00–26.50	20.50–21.00	20.50–21.00	20.50–23.00	....
Buffalo	32.00–34.00	30.00–32.00	30.00–32.00	30.00–32.00	30.00–32.00	28.00	19.50	19.50	22.00	20.50
‡Detroit	27.00–27.50	....	27.00–27.50	27.00–27.50	27.00–27.50	25.00–25.50	20.00–20.50	20.00–20.50	22.00–22.50	22.00–22.50
Valley	32.50	32.50	....	32.50	....	....	26.50–27.00	....	27.50–28.00	27.50–28.00
Mansfield	....	....	....	....	....	....	26.00	....	28.00	....
St. Louis	28.25–28.75	28.75	....	....	....	....	23.25–23.75	....	23.25–23.75	....
Birmingham	22.00–22.50	22.00–22.50	22.00–22.50	22.00–22.50	22.00–22.50	20.00–20.50	14.50–15.00	14.50–15.00	16.50–17.00	15.50–16.00
San Francisco	19.50	19.50	19.50	19.50	19.50	10.00	8.00	....	....	....
Seattle	19.00	19.00	19.00	19.00	19.00	17.00	11.50	11.50	....	....
Los Angeles	16.50	15.50	....	14.50	14.50	....	8.00	8.00	....	....

ELECTRIC FURNACE, FOUNDRY AND SPECIAL GRADES

	Bar Crops and Plate	Cast Steel	Punchings and Plate Scrap	Electric Furnace Bundles	Heavy Turnings	Alloy Free Turnings	Cut Structural and Plate Scrap 1 ft and under	Cut Structural and Plate Scrap 2 ft and under	No. 1 Chemical Borings	Tin Can Bundles
Pittsburgh	35.00–36.00	36.00–37.00	36.00–37.00	35.00–36.00	32.00–33.00	29.00–29.50	35.00–36.00	35.00–36.00	32.00–35.00	28.50–29.50
Philadelphia	34.00–34.50	34.00–34.50	34.00–34.50	....	34.00	32.50–33.00	....	35.00–36.00	35.00–36.00	31.00–31.50
Chicago	31.50–35.00	31.50–35.00	31.50–35.00	31.50–35.00	28.50–31.00	....	31.50–35.00	31.50–35.00	....	....
Cleveland	35.00	35.00	35.00	32.50	30.00–32.50	27.00	34.50	34.50	27.00	....
•Boston	29.35	29.35–29.85	29.35–29.85	29.35	26.35	25.35	28.85	28.85	25.85	....
‡New York	....	....	28.50–30.00	27.50–28.00	....	....	29.00–30.00	29.00–30.00	25.25–25.75	....
Buffalo	....	27.00	30.00–31.00	28.50	22.50	23.00	28.50	28.50	22.75	....
‡Detroit	....	....	28.50–30.50	30.50	....	....	....	....	....	....
Birmingham	24.50–25.00	24.50–25.00	24.50–25.00	....	....	....	24.50–25.00	24.50–25.00	....	....
San Francisco	18.00	18.00	....	....	....	8.00	20.50	20.00	....	17.00
Seattle	....	....	21.50	....	....	....	21.50	21.50	....	....

STEEL GRADES OF RAILROAD ORIGIN

	No. 1 Heavy Melting R.R. Steel	Railroad Malleable	Rails: Axles	Rails: Rerolling	Rails: Random Lengths	Rails: Cut 3-ft and under	Cut 18-in. and under	Railroad Specialties	Uncut Tires	Angles, Splice Bars
Pittsburgh	32.50	40.00–41.00	38.50	35.00	33.00	35.00	36.25	36.00–36.50	35.00	35.00
Chicago	31.00	....	....	38.00–39.00	37.00–38.00	40.00–41.00	41.00–42.00	36.50	....	37.00
Cleveland	32.00	45.00	....	35.00–36.00	38.00–39.00	39.00	39.00	30.50	36.50	28.50
Cincinnati	29.50	35.00	....	36.00	36.00	....	40.00	....	....	....
Valley	32.50	....	....	....	....	....	....	....	....	....
St. Louis	....	40.00–41.00	....	34.00–37.00	33.00–35.00	37.00–45.00	....	....	29.00–33.00	36.00–37.00
Birmingham	23.00–23.50	....	....	25.50–26.00	24.00–24.50	26.50–27.00	27.50–28.00	....	....	25.50–26.00
San Francisco	....	....	26.50	....	21.00	....	....	....	23.00	....
Seattle	20.00	27.50	....	....	20.00	....	....	....	....	21.50

CAST IRON GRADES

	No. 1 Cupola Cast	Charging Box Cast	Heavy Breakable Cast	Stove Plate	Unstripped Motor Blocks	Malleable	Brake Shoes	Clean Auto Cast	No. 1 Wheels	Burnt Cast
Pittsburgh	42.00–43.00	40.00–41.00	35.00–36.00	39.00–40.00	36.00–38.00	40.00–41.00	33.00–34.00	43.00–44.00	40.00–41.00	35.00–36.00
Philadelphia	43.00	42.00	41.50–42.00	....	38.50–40.00	45.00	....	43.00	42.00	....
Chicago	40.00–45.00	....	....	....	....	40.00–45.00	....	35.00–40.00	....	....
Cincinnati	40.00	30.00	32.00	28.00	30.00	....	28.00	40.00	....	....
•Boston	42.00–44.00	36.00–38.00	35.00–37.00	36.00	....	....	....	38.00–40.00	....	....
‡New York	39.50–40.00	37.50–38.00	....	....	34.50	40.00–41.00	....	....	....	....
Buffalo	35.00–40.00	31.00–35.00	....	33.00–38.00	....	34.00–38.00	....	38.00	32.75–33.25	....
‡Detroit	35.00–37.00	....	28.00–30.00	....	....	....	....	35.00–37.00	....	....
•St. Louis	35.00–37.00	30.00–35.00	30.00–32.00	29.00–34.00	....	....	28.75–31.00	35.00–37.00	34.50–36.50	25.00–30.00
Birmingham	30.00	....	25.00	28.00	25.00	....	22.75	....	27.00	....
Seattle	27.50	22.50	21.50	25.50	21.50	27.50	27.50	27.50	24.00	....
Los Angeles	30.00	....	....	....	....	....	....	....	....	....

• For shipping point; ‡ fob tracks; ‡ dealers buying prices, fob shipping point; § nominal; •• fob dealers yard.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 19.50c, del. Conn.; Lake, 19.62½c, del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 19.25c, refinery, 20,000 lb or more; 19.50c, less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 20.50c; 88-10-2 (No. 215) 24.75c; 80-10-10 (No. 305) 23.50c; No. 1 yellow (No. 405) 16.25c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than 20 tons.

Zinc: Price western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 12.80-12.85c, chemical 12.90c, corroding 12.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 (type) 17.00c; No. 12 foundry alloy (No. 2 grade) 16.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 17.00c; grade 2 (92-95%) 16.25c; grade 3 (90-92%) 15.75c; grade 4 (85-90%) 15.50c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlots; 22.50c 100 lb to c.l. Extruded 12-in. sticks 34.00c-38.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straights), 70.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 69.87½c; Grade C, 99.65-99.79% incl. 69.62½c; Grade D, 99.50-99.64% incl., 69.50c; Grade E, 99-99.49% incl. 69.12½c. Grade F, below 99% (for tin content), 69.00c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 28.25c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 28.75c. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; and 2c for 223 lb and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $88-$92 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.50 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.55.

Cobalt: 97-98%, $1.50 lb for 550 lb (keg); $1.52 lb for 100 lb (case); $1.57 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y. 70.75c per ounce.

Platinum: $58-$61 per ounce.

Palladium: $24 per troy ounce.

Iridium: $110 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 19.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 30.93c; Yellow brass 27.53c; commercial bronze, 95% 31.07c, 90% 30.56c; red brass, 85% 29.53c, 80% 29.02c; best quality 28.44c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 35.79c; nickel silver, 18%, 39.82c; phosphor bronze, grade A, 5%, 48.82c.

Rods: Copper, hot rolled 27.28c, cold drawn 28.28c; yellow brass, free cutting, 22.28c, not free cutting 27.22c; commercial bronze, 95% 30.76c, 90% 30.25c; red brass, 85% 29.22c, 80% 28.71c; best quality 28.13c.

Seamless Tubing: Copper 30.97c; yellow brass 30.29c; commercial bronze 90% 32.97c; red brass 85% 32.19c, 80% 31.68c; best quality brass 30.85c.

Copper Wire: Bare, soft, fob eastern mills, carlots 25.52c, less carlots 26.02c; weatherproof, fob eastern mills carlot 26.42c, less carlots 26.92c; magnet, delivered, carlots 28.93c, 15,000 lb or more 29.18c, less carlots 29.68c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lb or more del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers: Full sheets 16.25c, 140 sq ft rolls; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft.
Pipe: Full coils 15.50c; cut coils 15.75c.
Lead Traps and Bends: List plus 38%.

Zinc Products: Sheet, 15.50c-15.75c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c-14.75c, fob mill, 36,000 lb and over.

PLATING MATERIALS

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lb to 1 ton 17.75c; under 400 lb 18.25c.

Copper Anodes: In 500-lb lots, fob shipping point, freight allowed, cast oval over 15 in., 36.87½c; flat untrimmed, 36.87½c; electro-deposited, 30.62½c.

Copper Carbonate: 52-54% metallic Cu, 250 lb barrels nom.

Copper Cyanide: 70-71% Cu, 100-lb kegs or bbls. nom., fob, Niagara Falls.

Sodium Cyanide: 96%, 200-lb drums 15.00c; 10,000-lb lots 13.00c fob Niagara Falls.

Nickel Anodes: 500-2999 lb lots; cast and rolled carbonized 51.00c; rolled depolarized 52.00c.

Nickel Chloride: 100-lb kegs or 275-lb bbls 18.00c lb, del.

Tin Anodes: 1000 lb and over nom. del.; 500-999 nom.; 200-499 nom.; 100-199 nom.

Tin Crystals: 400 lb bbls nom., fob Grasselli, N. J.; 100-lb kegs nom.

Sodium Stannate: 100 or 300-lb drums nom. del.; ton lots nom.

Zinc Cyanide: 100-lb kegs or bbls 33.00c fob Niagara Falls.

SCRAP METALS

BRASS MILL ALLOWANCES

Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	17.125	17.125	16.375
Yellow brass	13.750	13.250	12.875
Commercial Bronze			
95%	15.875	15.625	15.125
90%	15.750	15.500	15.000
Red brass			
85%	15.500	15.250	14.750
80%	15.375	15.125	14.625
Best Quality (71-79%)	14.625	14.375	....
Muntz metal	12.875	12.625	12.125
Nickel silver, 5%	14.500	14.250	7.250
Phos. bronze, A, B	18.125	17.875	16.875
Naval brass	13.250	13.000	12.500
Manganese bronze	13.250	13.000	12.375

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 17.00, No. 2 copper 16.00, light copper 15.00, composition red brass 16.00, auto radiators 13.00, heavy yellow brass 11.50, brass pipe 12.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper, 17.25-17.50c; No. 2 copper 16.25c; light copper 15.00-15.25c; refinery brass (60% copper), per dry copper content, 14.87½-15.25c.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire, No. 1 15.50-16.00; No. 2 14.50-15.00; light copper 13.50-14.00, No. 1 composition red brass 14.00-14.50, No. 1 composition turnings 13.00-13.50, mixed brass turnings 9.50-10.00, new brass clippings 13.00-13.50, No. 1 brass rod turnings 11.75-12.25, light brass 8.00-8.50, heavy yellow brass 10.00-10.50, new brass rod ends 12.00-12.50, auto radiators, unsweated, 11.00-11.50, clean red car boxes 12.50-13.00, cocks and faucets 11.75-12.00, brass pipe 11.50-11.75.

Lead: Heavy lead 11.25-11.50, battery plates 6.50-6.75, linotype and stereotype 13.50-14.00, electrotype 11.50-12.00, mixed babbitt 12.00-12.50, solder joints 13.50-14.00.

Zinc: Old zinc 5.50-6.00, new die cast scrap 5.50-6.00, old die cast scrap 4.00-4.50.

Tin: No. 1 pewter 44.00-45.00, block tin pipe 60.00-62.00, auto babbitt 35.00-36.00, No. 1 babbitt 35.00-38.00, siphon tops 38.00-40.00.

Aluminum: Clippings, 2S, 9.50-10.00, old sheets 7.50-7.75, crankcases 7.50-8.00, turnings 4.00-4.25, pistons, free of struts, 6.75-7.00.

Nickel: Anodes 19.50-20.50, turnings 16.50-17.50, rod ends 19.00-20.00.

Monel: Clippings 14.00-15.00, turnings 9.00, old sheet 12.00-13.00, rods 12.50-13.00, castings 10.00.

Sheets, Strip . . .

New England tack-makers report improvement in tack plate supply

Sheet & Strip Prices, Page 126

Boston—Improved supply of plate for tack-makers is in the offing. Apollo Steel Co. plant, Apollo, Pa., will produce this sheet grade at a rate approaching 1000 tons a month. Atlas Tack Corp., Fairhaven, Mass., will be covered and several hundred tons in addition will probably be available to other tack manufacturers. Atlas is one of the 23 steel consumers operating the Apollo mill; contract is for one year only and the New England member of the group does not expect to do more than purchase a part of requirements from the mill owners after Dec. 31, 1947, if the unit continues to roll tack plate. While Atlas has contracted for a larger amount than estimated monthly requirements this year, it is possible most of the surplus will be rolled into sheets other than tack plate. Several tack-makers formerly obtaining at least part of their requirements from Mahoning Valley Steel Co., Niles, O., will also get some Apollo tonnage. Tack plate, a hot-rolled sheet classification, has for months been one of the tightest flat-rolled products.

Irregular supply and unbalance in hot-rolled strip inventories is a major hampering factor in the inability of cold strip producers to maintain planned output. This complicates deliveries. Some tonnage due to be shipped this quarter will go over into the second quarter, while other volume is scheduled for later months, depending on hot strip specifications and sizes available for cold reducing. Most mills are barely covering regular customers and are unable to take on new accounts. Demand is heavy from consuming industries.

While consumption of shoe shank steel is off somewhat, inventories are low and inquiry has not slackened, most users with storage space seeking to build up stocks. Although there are exceptions, the spread between cold and hot-rolled strip has narrowed through recent price adjustments for nonintegrated units.

Chicago — Consumers of sheets are pressing for increased allocations, but have slight chance of getting them. Producers who are booking business on a quarterly basis will be required to cut back quotas in some cases to offset the tonnage lost through the coal strike, the reductions being designed to place mills on a tenable basis by end of second quarter. Some other mills which accepted business for the first half have carryovers ranging from three to six weeks and there is little optimism that even at full production much reduction can be accomplished by June 30. Galvanized sheets are in worst position.

Philadelphia — The sheet trade looks for new prices shortly on silicon grades, these being one of the few products on which no action has yet been taken. Sheet consumers continue to press the mills for word on second quarter allotments. This information should be forthcoming shortly.

Cincinnati — Mills are looking forward to second quarter with hopes of holding the carryover of sheet orders to a small proportion of those which clogged first quarter schedules. As a result, mill interests are striving to prevent dislocation of rolling plans and are standing pat on original allotments despite pressure for heavier deliveries. Opening of books for second quarter, which is not expected for several weeks, may disclose more plainly the trend toward concentration of sales to avoid long freight hauls.

Birmingham — Sheet steel probably is the most consistently scarce item produced in this district. Sheet processors continue to report inability to get adequate supplies. Pressure for roofing sheets is not quite so insistent. Production of sheets remains near the capacity mark in this section.

St. Louis — Sheet deliveries remain seven to eight months behind schedule and may lag further soon. A CPA pig iron cutback has kept the leading roller in this district at 80 per cent of capacity more than a month. A shutdown before the end of the month is indicated unless iron supplies increase. The mill has gone to 15 per cent pig in the melt instead of the usual 25 per cent. Old machinery, due to be replaced with completion of a new cold rolling mill in May, is being melted to avoid depleting scrap piles below the two-week level. The new rolling equipment will equalize finishing and ingot capacity when adequate raw materials are available. Demand for sheets continues unabated and a bulge in the volume of inquiries is noted this month. Mills are filling some third quarter, 1945, orders now and 1947 books will not be open before March. Steel is reported in the shortest supply locally in history.

Carnegie-Illinois Raises Electrical Sheet Prices

(*Concluded from Page* 47)

by steel producers. The nearest basing point to destination now governs, plus the rail rate to seaboard, ocean freight rate, and arbitrary marine insurance, dock handling and loading and switching charges which vary at most ports. In effect the West and Gulf Coast prices for all steel products are on a delivered basis as above outlined. The only exception to above pricing formula will be those prices soon to be announced by producers on the West Coast for size and finish of products produced.

Another revision in pricing policy now followed by steel producers is establishment of price basis at specific points only for products within the size range and finish produced. Producers are meeting competition at those centers where they have no production facilities only to the extent of range of sizes and finish produced by competitors. Due to excessive freight absorption some sellers no longer are selling in certain markets where closer governing basing point puts them at a freight disadvantage.

Plates . . .

Plate Prices, Page 127

Pittsburgh — In contrast to policy followed under OPA, producers are meeting competitors' prices for only those sizes produced at a specific basing point, while in some instances sellers have withdrawn entirely from certain markets because of excessive freight absorption. Lukens Steel Co. is selling entire output at Coatesville price base. This interest has raised open-hearth alloy plate price to $4.15 per 100 pounds, Coatesville; other producers have not yet taken any price action on this item. New prices for clad steel plates, 10 per cent cladding, Coatesville, are up about 20 per cent as follows: Nickel clad, $21.50 per 100 pounds; inconel-clad, $30; monel-clad, $29. Lack of plates keeps plate fabricators' operating schedules well below normal. This situation has forced most fabricators to fall well behind projected delivery promises which in turn has resulted in a dropping off in new inquiries. Fabricators state recent advances in base prices and extras mean an increase up to $14 a ton on plates. On most municipal contracts these price advances cannot be passed along.

New York — Stringency continues in plates. Certain leading sellers, quoting on a quarterly basis, will soon set up allotments for second quarter, but they are expected to fall far short of requirements, notwithstanding the fact the mills will be in somewhat better shape with respect to arrearages. Some producers, not selling on a quarterly basis, are booked months ahead, with at least one eastern mill now booked into fourth quarter.

Meanwhile, there is a persistent demand for the light gages for small gasoline storage tanks; also freight car requirements are pressing, with both steel producers and car builders endeavoring to cooperate in a program for stepping up building badly needed freight cars.

Boston — Slightly improved supply of raw materials has enabled at least one eastern producer to increase plate production with expectations of starting currently on allocations by May, working off carryovers by the previous month. Meanwhile demand for light plates is unsatisfied and plate shops fabricating those sizes, for tanks primarily, are short of steel as are warehouses. Several large consumers are reviewing specifications with new extras factors in view, but in many instances for industrial uses, basic changes in analysis are doubtful. Most producers are charging killed and semikilled extras whether specified or not, affecting heavier gages notably. Several basing points apply in this area, bulk being on Sparrows Point, Md. Pressed flanged work is quoted for March delivery, also spun heads under 60 inches.

Philadelphia—Outside plate mills normally active in this district are meeting eastern competition. Meanwhile, the local delivered price continues at 2.85c, based on a 2.65c, Sparrows Point base, plus 20 points for freight. This is one point less than the delivered price from Claymont, which was the governing basing point when prices were on a more uniform basis.

Birmingham — Plate output, while holding at a near-capacity rate, is rather hard put to keep abreast of demands. Plate is in heavy demand for general shipbuilding and repairs along the Gulf Coast and from tank manufacturers and steel fabricators, all of whom complain of inability to meet requirements.

Seattle—Steel plate shops are operating close to capacity with a good run of small jobs involving tonnage of 20 to 50 tons each. Materials are short and plants are in no position to commit themselves for large projects. Out-of-stock steel is being used for current commitments as allocations and deliveries continue unsatisfactory.

An example of mass grinding at a greater profit.

Six ensilage knives are held on a 36" magnetic chuck of a No. 18 Blanchard Surface Grinder. The materials, combining mild and tool steel, make this one of the most difficult of grinding jobs. Size of the piece, and tolerance are as shown in the sketch.

Average stock removal is .020" each side. Both sides of the knife are Blanchard ground.

Production is 24 pieces (48 surfaces) per 50-minute hour. This includes loading and unloading time.

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A Blanchard service that you may not know about is "SAMPLE GRINDING." Full details of this service are given on Page 77 of the Blanchard book illustrated below. Ask for your free copy.

Send for your free copy of "Work Done on the Blanchard", third edition. This new book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.

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Steel Bars . . .

Supply of cold-finished bars improves as output gains, demand eases

Bar Prices, Page 126

New York—Producers have begun to announce quotas on cold-drawn bars, and similar action is expected to be taken shortly by those, quoting on a quarterly basis, in setting up allotments on hot carbon bars. Quotas on cold-drawn rounds, squares and hexagons will continue limited, and in the case of small flats arrearages are so heavy at least one large producer is not planning to provide allotments at all. On the other hand, cold-drawn bars, ranging from 1½ to 3 inches in diameter, are likely to be in fairly easy supply new quarter.

Larger sizes of hot carbon bars are in easier supply, and allotments for next quarter should reflect this condition; however, there is little prospect of early improvement on the smaller sizes. Sellers of hot alloy bars are still able to promise shipments before the end of this quarter, although some are in a more extended position on the cold alloys, which means early second quarter.

Producers are working closely with their customers on the application of extras to unshipped orders placed before the recent changes went into effect. Unless consumers change their specifications, they will come in for charges in many cases they had not originally contemplated.

Pittsburgh — Output of cold-finished bars has improved recently, reflecting better balanced inventories. New orders for cold-drawn bars are off seasonally and some cut-backs of orders on mill books are reported. No opposition to higher prices is noted, although consumers have revised specifications to avoid unnecessarily bundling and nonstandard classification extras. There is still considerable confusion in the application of the "killed" steel extra for there is yet no consistent policy established by all producers in charging this extra. In contrast to extended deliveries on merchant bars, order backlogs for alloys are relatively light.

The mills are no longer selling NE steels as such. These steels have been incorporated in the hot-rolled alloy bar card under proper AISI chemical composition designation number. Pittsburgh Steel Co. soon is expected to announce new prices on bars. The advance in hot-rolled and cold-rolled bar price bases should permit greater output of the smaller sizes, held back by uneconomical price levels.

For size ranges produced on West coast, Columbia Steel Co. has established a delivered price on carbon bars of $3.560 delivered San Francisco; $3.570 delivered Los Angeles. For reinforcing bars the delivered price is $3.075 at San Francisco; $3.65 at Los Angeles.

Boston—Second quarter carbon steel bar quotas will be slightly higher, although in smaller sizes not much easing is likely in the immediate future. Larger sizes are already in better supply and alloy tonnage is ample, except possibly in small cold-drawn. Improvement is also noted in cold-drawn carbon bars over one-inch. Steel users are still uncertain as to their steel costs this quarter and there is considerable revision in orders to duck extras, notably in loading, packaging and service categories. Demand for resulphurized bolt steel, now taking the new extras for added sulphur, is at a high level.

Reed & Prince Mfg. Co., Worcester, Mass., has been awarded a substantial screw contract for Watervliet, N. Y., arsenal on 90-day delivery.

Philadelphia — Demand for small hot-rolled and cold-drawn carbon bars continues strong, with announcement of quotas for next quarter eagerly awaited. One large producer, in fact, has set up allotments on cold-drawn, with action by others expected to follow shortly. Outlook on the larger sizes of cold-drawn bars is easier, and good deliveries can be had on hot and cold alloys. Most alloy bar producers still have tonnage available for shipment before the end of this quarter.

Seattle — Rolling mills have received union demands, calling for a substantial increase in wages, portal-to-portal pay, and other extras. The scale presented ranges from 15 to 20 per cent higher than the proposed eastern scale and operators declare it unreasonable. Mills are trying to reduce backlogs as much as possible. Only small contracts are being taken and preference is given to regular customers. Highway construction is becoming an important market factor, but many large projects have been postponed due to present high costs. No major reinforcing bar tonnages have been booked, but many projects are being figured.

Wire . . .

Wire Prices, Page 127

Pittsburgh—As in other steel products, merchant and manufacturers wire producers in announcing price advances have established price bases at points of production for only sizes and ranges produced in those areas. Competitors' price bases are being met in most instances, although some producers are no longer meeting the Chicago, Cleveland, Worcester, and Pacific coast price bases due to excessive freight absorption necessary on sales into those areas. One producer here has withdrawn from West Coast on all wire items and eliminated Chicago and Worcester on manufacturers wire; Cleveland on merchant wire items. Unusually large inquiries for wire and wire rods recently have been received from West Coast consumers indicating a number of producers no longer are selling in that area. Output of wire rods continues to fall short of immediate needs with nonintegrated interests in New England reporting inadequate stocks. Supply of merchant and manufacturers wire is expected to be tight through remainder of year.

New York—Bergen Wire Rope Co., Lodi, N. J. has been awarded 675,000 pounds of the 1000 tons, 7/16-inch steel wire strand, bid to the U. S. engineer, Memphis, Tenn. at 10.00c per pound.

Weaving wire, exclusive of fly screen cloth stock, 18 gage and finer, has advanced an average of $10 a ton. This is a low-carbon product. Wire mills are not making any dent in order backlogs for most products, although in spots demand lags in contrast to record peak estimated requirements for many more fine wire items. Saddled on production schedules, made difficult by lack of rods due to limited supply available, are many new applications and uses for wire emanating from new comers in the fabricating field or old customers asking for twice or more tonnage than ever required before.

Chicago — Showing no particular objection to the higher prices and new extras on wire recently made effective, consumers appear to feel that these should bring higher volume production, and, consequently, are pressing relentlessly for increased allocations. This is particularly true for manufacturers' items. Buyers of merchant products are showing a notable tendency to be more selective as regards specifications, and are seeking items which have been scarce for a long time. Among the items are heavier gage fence, which is becoming more plentiful because of changes in mill operations.

Birmingham — Some easing in demand for wire products is evident in this section, especially since inclement weather has materially slowed down general agricultural repair work. The momentary relief is mostly in nails and wire fencing, neither of which, however, are in sufficient current supply.

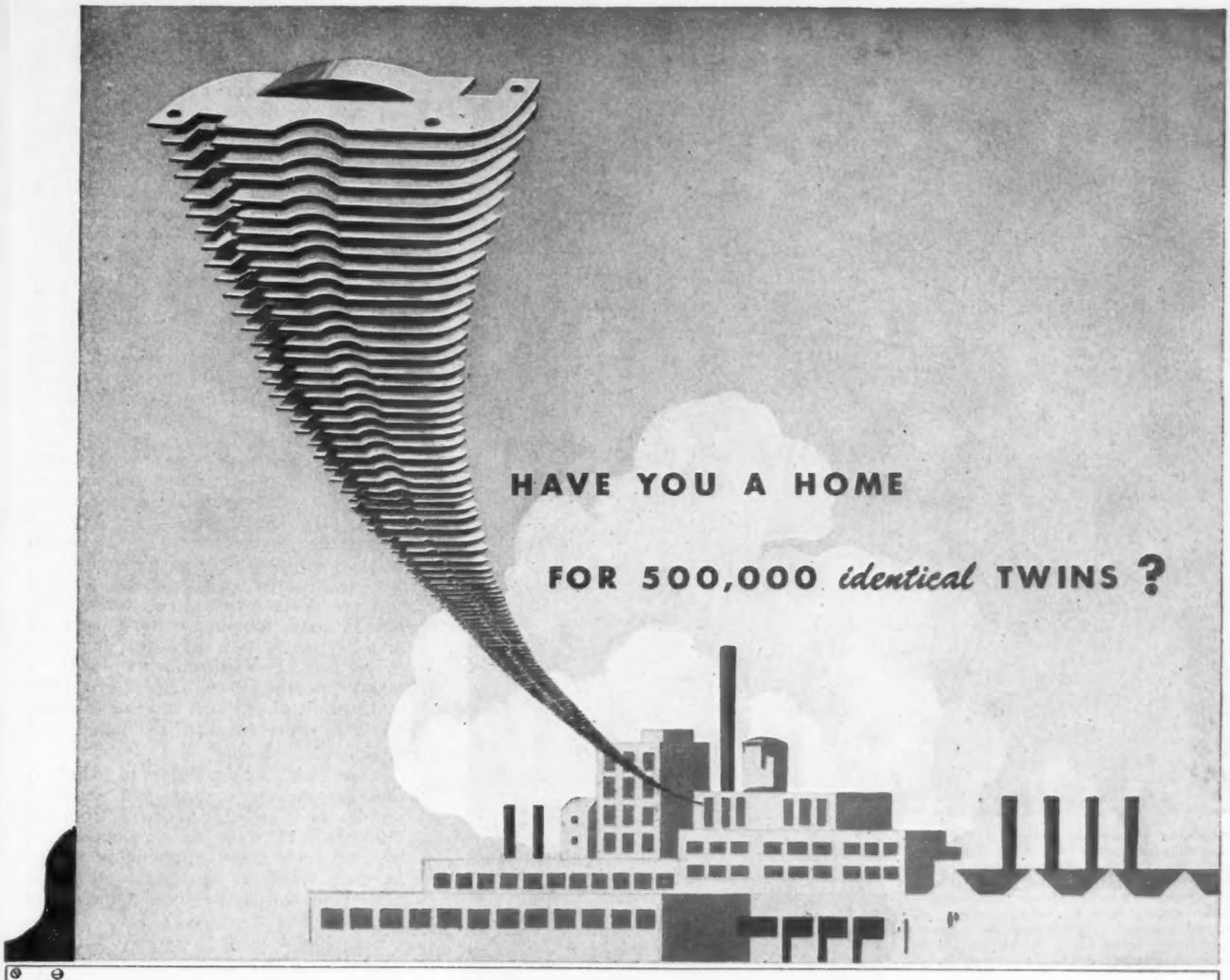
Tin Plate . . .

Tin Plate Prices, Page 127

Pittsburgh — First quarter tin plate export quota, previously placed at 130,000 tons, may be increased to about 211,000 tons as result of pressure from the Office of International Trade. However, considerable opposition to the increasing of the export directive has been voiced by industry officials and Department of Agriculture. Production schedules are booked to capacity for export this quarter with 75,000 tons carryover tonnage plus 55,000 tons which consumers were permitted to draw against late in final period last year. Establishment of Warren, O., as a price base on tin plate means producers in Pittsburgh area will have to absorb from 20 to 80 cents freight per ton on shipments into New England, upper New York state and Canada. No action has been taken in establishment of a price base at Yorkville, O., and Weirton, W. Va. With beer, coffee and other products now permitted to be packaged in tin plate containers, demand for electrolytic tin plate likely will be increased as users of black plate switch over to electrolytic.

New York—Export quotas of tin plate for second quarter are expected to be announced shortly. Meanwhile, the preliminary quota for the current quarter of 55,000 tons has not as yet been supplemented but it is believed that an additional 65,000 tons will eventually be set up, bringing the total to about 120,000 tons, as compared with 136,000 set aside for export in the fourth quarter of last year.

Chicago — Box car shortage once more is felt in this district and tin plate producers on frequent occasions are forced to pile production until cars arrive. So far, shipments which accumulate through the work week can be dispatched with better car receipts over a weekend. Tin plate producers fear they may be obliged to take additional export tonnage in first quarter, and since tin departments are now operating at full capacity, this would reduce material for domestic consumers. As matters stand, consumers are pressing urgently for increased allotments, but their prospects for getting them are slim.



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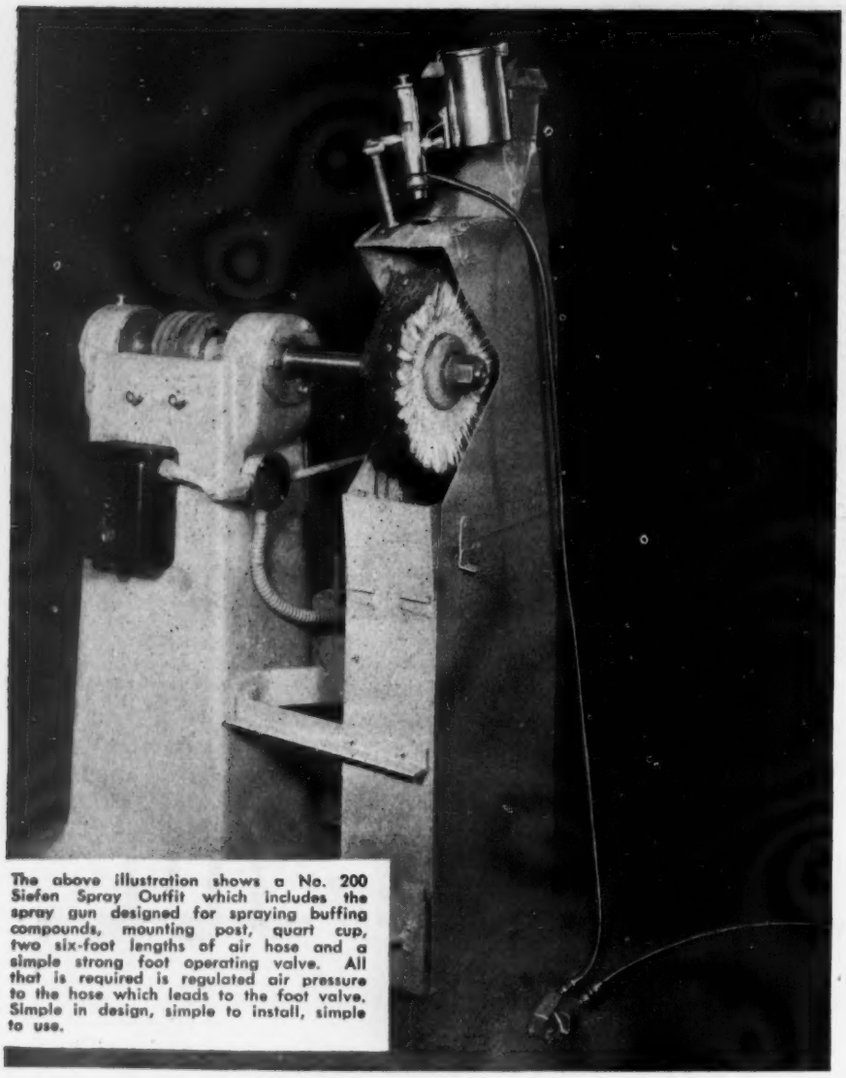

The above illustration shows a No. 200 Siefen Spray Outfit which includes the spray gun designed for spraying buffing compounds, mounting post, quart cup, two six-foot lengths of air hose and a simple strong foot operating valve. All that is required is regulated air pressure to the hose which leads to the foot valve. Simple in design, simple to install, simple to use.

NU-SPRA-GLU
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NU-SPRA-GLU is a LIQUID GLUE and ABRASIVE mixture that can be sprayed to a revolving wheel. Introduced 18 months ago, it has been widely used for producing satin finish on nearly all types of metals. NU-SPRA-GLU replaces greaseless compound, and represents a new step in buffing development. It works most efficiently, produces excellent results, does not go down the blower or on the floor, and *lasts longer on the wheel.* NU-SPRA-GLUE can be supplied in all sizes from 120 to 600.

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BUFFING NU-SPRA-GLU is a LIQUID GREASE and ABRASIVE mixture that can be sprayed to a revolving wheel. On the market only a year and a half, BUFFING NU-SPRA-GLU has been used successfully to replace bar compounds. It gives dividends four ways: it imparts a mirror finish to the metal; it saves 70% of the compound; it gives a 30% saving of buffs; it eliminates injury to buffers.

Tell us about your buffing and polishing problems. We are in a position to help you, and our engineers are conveniently located for free consultation.

*Patent on method has been applied for.

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Tubular Goods . . .

Tubular Goods Prices, Page 127

Pittsburgh — On shipments commencing Jan. 20, Babcock & Wilcox Tube Co., Beaver Falls, Pa., advanced carbon, molybdenum and low-chrome seamless alloy steel pressure tube prices commensurate with recent increases made in alloy bar prices. A similar price revision was announced by Timken Roller Bearing Co., Canton, O., effective on shipments Jan. 14. The 10 per cent export premium announced to the trade by Babcock & Wilcox Co., Nov. 15, 1946, on seamless carbon steel tubes, and Dec. 26 last on welded carbon steel boiler tubes will also apply to present increased list prices. Maximum quantity deduction will be 10 per cent for 40,000 pounds or feet and over on cold-drawn alloy tubing. The deduction of 15 per cent for 100,000 pounds or feet and over no longer is in effect. On hot-finished alloy tubes weighing 10 pounds per foot and under, the maximum quantity deduction will be 10 per cent which applies on any quantity of 40,000 pounds or feet or more of one size and one analysis. On hot finished tubing weighing over 10 pounds per foot, a quantity deduction of 10 per cent will apply for 40,000 to 100,000 pounds of one size. If over 100,000 pounds of one size and one analysis, 15 per cent quantity deduction will apply.

New York — Distributors of merchant pipe are moving tonnage just about as rapidly as it is being received from the mills. In fact, some have practically no pipe on their floors, applying such pipe as does come in to orders previously placed, in certain instances some weeks beforehand.

Some pipe mills in an effort to get caught up with arrearages are making no future commitments for certain months ahead, especially in lap weld. One producer last week, for instance, promised regular quotas to jobbers for only the first two months of next quarter, skipping the third one entirely. As to the general trade, promises on lap weld pipe apply only to first month of next quarter, with nothing to be shipped for the succeeding four months. Beginning with September, however, tonnage is being accepted for shipment over the remaining four months of the year. In butt weld the situation is somewhat better with this seller than in lap weld or seamless, with both jobbers and direct buyers being promised tonnage for each of the three months of next quarter and with business being accepted for direct consumer account for each month over the last half. In fact, among the larger producers generally butt weld is in better supply than the other merchant grades; however, some are refusing to commit themselves, especially for jobber account, more than a month ahead.

Certain leading producers of tubing are booked up several months ahead. In fact, one has nothing to offer before July and that only in the larger sizes, 4-½ to 5-½ inches inclusive by 8 gage and heavier. In cold drawn carbon, condenser and super heater tubes, this interest has nothing available before August, in the 4-inch diameter and over, and nothing before September in the 5 to 5-½ inch diameter pipe.

Demand for locomotive boiler tubing is principally for locomotives scheduled

GOVERNMENT-OWNED STEEL BAR AND WIRE MILL

FOR SALE OR LEASE!

This plant was designed for the production of bullet core and alloy steels and is equipped to manufacture bar stock steel and wire. Operated during the war under the supervision of Allegheny Ludlum Steel Corporation. These facilities have an annual capacity of 18,000 tons of alloy bars and wire. The entire plant is offered for sale or lease, either as a whole, or as land and buildings equipped with services only, and as machinery and equipment to be sold for removal to another site.

LOCATION: Approximately 10 acres in Dunkirk, New York.

BUILDINGS: Total floor area about 210,000 square feet. Main building, mill type, 216′ x 875′, three aisles, used for billet heating, bar rolling, annealing, finishing and shipping. Floor area, 191,700 sq. ft. Steel frame, exterior walls of brick, steel sash and asbestos-protected metal. Continuous monitor in center aisle. Clearance 40 feet and 29 feet. Crane tracks in all three aisles.

Administration and Laboratory Building, Service and Locker Building. Power and Substation. Total area, 16,900 sq. ft.

MACHINERY AND EQUIPMENT: Heating and annealing furnaces, merchants and bar mills, swing frame and centerless grinders, cold drawing equipment, straighteners, lathes, drilling, grinding, milling and shaping machines. Cranes in shop include one five-ton, five ten-ton, two twenty-ton, and one two-ton gantry.

UTILITIES: Power, light, water and sewerage services from local sources.

TRANSPORTATION: Pennsylvania Railroad siding on site. New York Central Railroad is one-half mile from plant. Dunkirk Harbor on Lake Erie is one and one-half miles from the plant.

An illustrated brochure describing this plant may be had on request.

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Proposals are invited for the purchase or lease of this property as a whole, or for the purchase or lease of land and buildings, or for the purchase of machinery and equipment, substantially as a whole, to be moved to another location. Sealed proposals for the acquisition of these facilities, which are known as Plancor 99, Allegheny Ludlum Steel Corporation, Dunkirk, New York, will be received by the War Assets Administration, P. O. Box 225, Wall Street Station, New York 5, New York, until 3:00 P.M. on March 3, 1947. On that day, all proposals will be opened and read at the Office of Real Property Disposal, 67 Broad Street, New York 4, New York. Specifications for the content of these proposals may be obtained from any War Assets Administration Regional Office. Reference to this property by the name of lessee is for identification only and has no connection with the lessee's own facilities. Information in this advertisement is not intended as a basis for negotiation. War Assets Administration reserves the right to reject any or all proposals.

All inquiries concerning this property should be addressed to:

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for shipment abroad. There is little domestic business of this character, except for repairs, as relatively few steam locomotives are being purchased by domestic carriers at this time. One reason for existing tightness in tubing has been the swing to tubing of pipe dimensions.

Boston—Boston merchant steel pipe distributors are getting tonnage against allocations to the extent of base period quotas and a few mills are doing slightly better. Beyond this level prospects for direct shipments through this year are dim and distributors' inventories are kept down by strong demand, notably for residential building, maintenance and repairs. Considerable tonnage required by utilities is yet to be placed. Wrought iron pipe quotas are also being met with limited tonnage available for direct shipments; demand for cement-lined wrought pipe, two-inch and under for water service connections, is substantial, slightly heavier after an inventory-period lull. Cast pipe by municipalities is seasonally off, but utilities maintain purchases.

Seattle—In spite of deferred deliveries and other unfavorable factors, demand for tubular goods is strong and many projects are up for figures. The largest tonnage pending is at Spokane, 750 tons, bids Jan. 23.

St. Louis—Demand for pipe continues to increase under the impetus of government pressure for more housing. Deliveries are six to eight months behind and schedules are filled through the first half.

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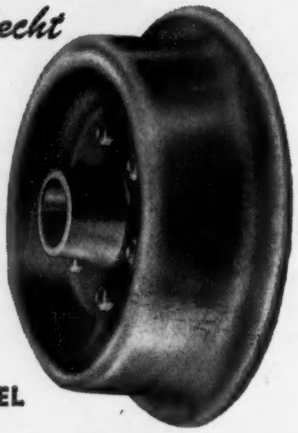

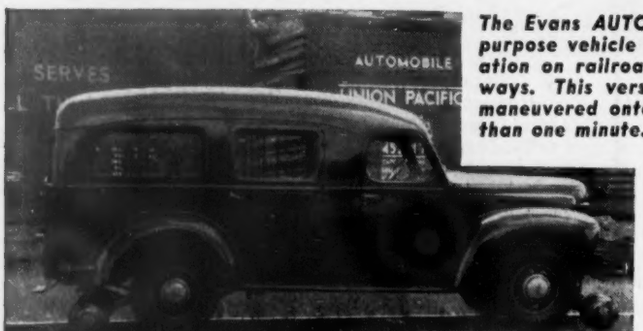

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Structural Shapes . . .

Structural Shape Prices, Page 127

New York—A sizable tonnage will be required for the superstructure for the truck terminal for the New York Port Authority in lower Manhattan on which approval was granted recently by the Civilian Production Administration. Bids on the foundation work will be asked next month. Another sizable project is the New Jersey state bascule bridge over the Passaic River, between Clifton and Rutherford, requiring 2000 tons, not including approaches, with bids opening Feb. 13. The American Bridge Co. has booked 3300 tons for five hangars in Virginia, and is low on 6000 tons for a state bridge in Connecticut, at Old Lyme. Several jobs have been placed recently ranging from 100 to 575 tons, the latter being for a boiler house at Port Jefferson, Long Island.

Various jobs are in the offing but are being delayed pending greater stabilization of costs and an easing in the shipments on various components, such as electrical equipment, required in structural work.

Pittsburgh — Structural mills are scheduled through first quarter and in most instances order backlogs represent 6 to 9 months' output. Mill deliveries easily could be extended through entire year if they were to accept, even on tentative basis, all tonnage offered. Structural fabricators and distributors are concerned over the rumor Bethlehem Steel is planning to withdraw from selling shapes on Pittsburgh and Chicago price base when shipments on present commitments are completed. Such a move would not only cut sharply into shape supply for this area but fabricators no longer would be able to take advantage of fabricated-in-transit privileges. Inadequate steel supply continues to retard fabricating activity in this district.

Boston — Although currently slow, potential inquiry for fabricated structural steel is substantial, notably for power plants, oil refineries and miscellaneous industrial construction on contracts held by district engineers. Some of this tonnage has been retarded by uncertain and high costs, but eventually will go ahead. Telephone building expansions and chemical plant work are planned in greater volume. District fabricating shops have fair small-lot backlogs and are pressing for additional plain material. Quotas have been raised slightly by one eastern producer in shapes as for certain other products as a result of curtailing distribution in the midwest, releasing more tonnage for seaboard fabricators.

Philadelphia — Activity in structurals in this district continues spotty, with the outstanding award involving 775 tons for a diesel plant for the Pennsylvania railroad at Harrisburg, Pa., placed with Belmont Iron Works, Eddystone, Pa. However, shape mills still have substantial backlogs. One district mill is virtually out of the market due primarily to poor operating schedules resulting from shortage of raw materials. At present, it is rolling on a basis of two weeks a month. Its last published price is 3.05c, Bethlehem, Pa., equivalent, but this appears to be purely nominal. In fact, some small sales have been reported at higher levels.

Chicago — Awards and inquiries for fabricated structural steel drag along at low level and there are few indications that any notable uplift will take place be-

fore spring. Fabricators have substantial backlogs of work and are operating up to the limit of their steel supply. Mills are behind on shipments of plain shapes and, although producing close to capacity, are unable to reduce their backlogs. Lack of size ranges to keep shop schedules moving evenly is most troublesome to fabricating shops.

Seattle — Structural shape fabricators are handicapped by lack of materials, allocations allowing them only half of their requirements. Consequently, only small jobs are being taken and major projects are being bypassed.

Pig Iron . . .

Shortage of pig iron continues acute in several consuming districts

Pig Iron Prices, Page 128

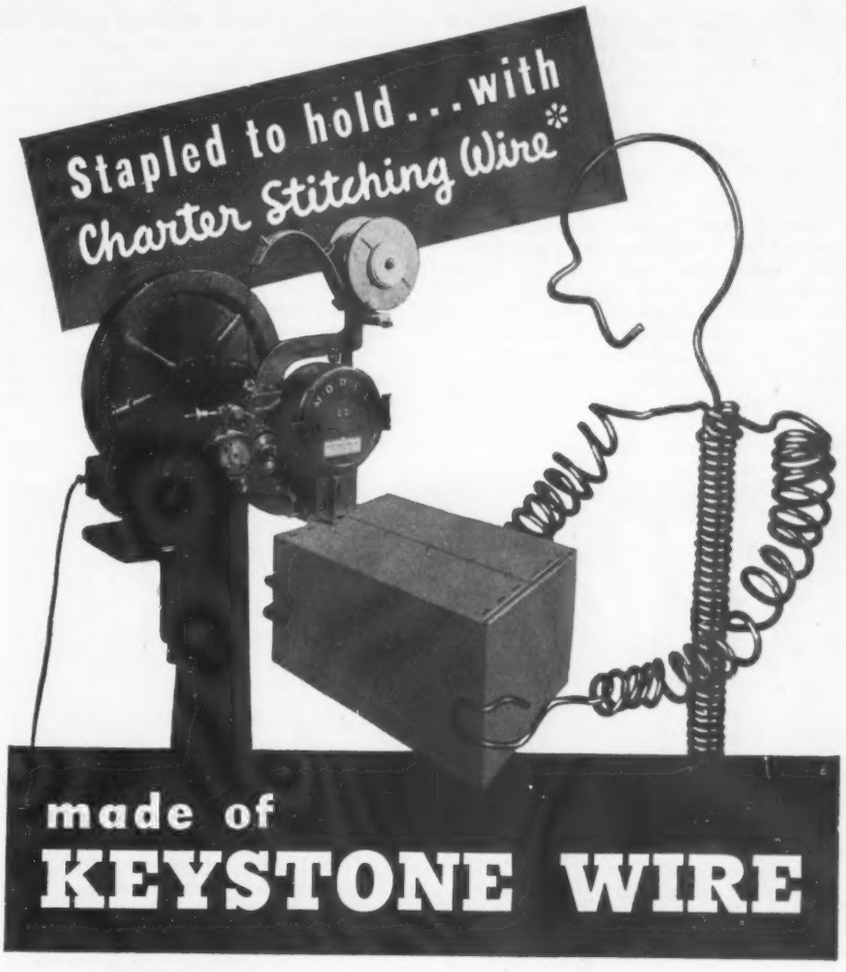
Philadelphia — Continued heavy movement of iron to rated consumers is causing many complications for producers and nonrated consumers alike. Furnaces are having to supply iron to some consumers out of all proportion to anything they have ever supplied to them before. In one case, a furnace must supply a consumer this month with ten times the amount it has ever shipped this buyer in an average month in the top prewar year. This has been at the expense of many regular nonrated customers of this furnace, most of whom have received little or nothing from this source. Other similar instances are reported, with a result that nonrated consumers generally are having the most difficult experience getting iron they have ever had, barring certain strike periods.

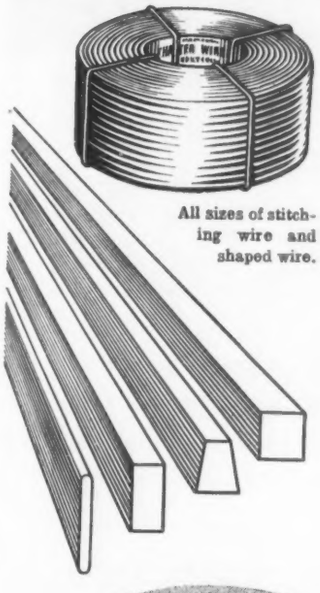
Most of the foundries are operating at well below normal, and would be running more poorly had they not paid prices for cast scrap out of all normal relationship. They also have used ingenuity in melting practice. Demand for alloy briquettes for sweetening mixtures has been so heavy that a shortage in briquets is now developing, to add to their complications, also with an acute shortage of coke.

There is a question in some minds as to which is in tighter supply, pig iron or coke. Supply of the latter naturally improved somewhat following the last coal strike, but at least in this district shipments are still being rationed and are falling short of demands. This reflects a continued lack of reserves, resulting from the coal and steel strikes of last year, and heavier seasonal demand for the gas companies and sellers for domestic fuel.

Shortage of pig iron has aroused inquiry in the trade as to the possibility of getting the Chester, Pa., stack back in operation. This furnace, after having been acquired and put in repair by the government, was operated for a couple of years during the war by the Pittsburgh Ferromanganese Corp., running mostly, if not entirely, on basic, with the ore coming from a Lake Superior property which has since changed hands. Since the end of the war, the Chester property has been offered for sale by the government, but not disposed of.

Suggestion has been made in some quarters that with the property in reasonably good shape (over $1 million was spent on operating it during the war) it





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could be gotten into production within a reasonably short time. Further labor supply is easier than when last reported. However, it admittedly would have to be subsidized by the government which constitutes a complication. Moreover, there is the severe shortage of coke which is regarded in some quarters as the greatest handicap.

New York—Pig iron consumers, not on a rated basis—and the great majority in this district are not—continue to be handicapped by lack of tonnage. Some are unable to operate at more than 50 per cent of normal capacity, and according to present indications they will not be able to step their production up to any considerable degree next month. More iron is being produced than in the closing weeks of last year and pig iron consumption is naturally heavier. However, many foundries are unable to get their operations up to anywhere near normal.

By-product coke production is likewise being stepped up with a result that it is not the bottleneck it was a few weeks ago, but consumers are unable to build up any stocks.

Buffalo—Tightness still grips the pig iron market, but some relief is expected with the relighting of a furnace that had been down for seven weeks. One of the area's leading merchant iron producers managed to blow-in one of two idle stacks, brightening prospects for numerous foundries here and in the Seaboard area that have been operating on a hand-to-mouth basis. Some melters had curtailed operations to three days a week. Easement is noted in the coke supply situation.

Chicago — Foundries still conduct their melting operations in keeping with pig iron supply, although scrap also remains scarce. While all blast furnaces which suspended production during and subsequent to the coal strike have now been returned to blast, shipments of iron have been restricted. Within the past two weeks, however, deliveries have improved measurably, and this in turn has enabled foundries to make moderate increases in schedules. Nevertheless, few are able to make castings at anywhere near full capacity. Coke supply is adequate for present needs.

Boston — By the end of June when the current premium program expires, Mystic Iron Works, Everett, will have produced close to 100,000 tons of foundry iron; beyond that date, production program is uncertain. Although still spread thin, foundry shortages are gradually being eased, although lower shipments from outside furnaces, notably Buffalo, tend to retard the balance. Where possible, in view of the cast scrap situation, both as to price and supply, ratio of iron in melts is also increased. Steel works are hard pressed for basic.

St. Louis — Pig iron supplies continue extremely tight. Some melters have been reaching southward despite heavier freight costs. Local production of iron was off two days last week for repairs. Increasing allocations of iron to foundries elsewhere for housing production is hurting here. The squeeze may increase if the city of St. Louis is successful in its appeal to the government for a 6000-ton increase in the allocation to the Granite City Steel Co. for manufacture of 100 miles of pipeline to allow the city to convert to natural gas.

Iron Ore . . .

Iron Ore Prices, Page 128

Cleveland — Consumption of Lake Superior iron ore declined 10 per cent in December due to the comparatively low steelmaking operations immediately following the strike of coal miners. Consumption amounted to 5,516,483 tons compared with 6,130,543 in November and 6,099,134 in December, 1945. This brought total 1946 consumption to 62,093,056 tons compared with 74,575,878 in 1945, according to the Lake Superior Iron Ore Association.

Total stocks of iron ore on hand as of Jan. 1 amounted to 37,464,533 tons compared with a revised total of 41,919,189 tons a month earlier and 39,058,650 as of Jan. 1, 1946. Of the total at the beginning of this year, 31,773,753 tons were at furnaces in the United States and 1,282,272 tons at Canadian furnaces. Stocks on Lake Erie docks in the United States came to 4,408,508 tons compared with 4,856,537 on Nov. 1.

The report showed that the industry had fully recovered from the effects of the coal strike by Jan. 1 when 168 furnaces were in blast in the United States compared with only 119 a month earlier and 152 a year earlier. Only 17 furnaces in this country were idle at the beginning of the year compared with 66 on Dec. 1 and 33 a year ago.

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Scrap . . .

Shipments to mills show improvement . . . Resistance to higher levels strengthens

Scrap Prices, Page 130

Pittsburgh — Further indication that the railroads, with few exceptions, are attempting to prevent an additional upward surge in scrap prices, is illustrated by the awards of the latest Pennsylvania railroad list. Railroad No. 1 heavy melting steel went at $32.50 per ton, including brokers commission; steel springs at $35.50 and other specialties at the usual price differential. Movement of scrap to consumers' yards has been impeded somewhat recently by adverse weather. Scrap supply situation is not expected to record much improvement until spring when more open weather conditions will permit greater collection and segregation of material. At that time it is also expected that more scrap will be generated at metalworking plants. Scarcity of foundry pig iron, due in part to fact mills are using more hot metal in open hearth operations, has forced most foundries to rely heavily on limited cast scrap available. This has forced a critical shortage of cast scrap on both East and West coasts. Many trade leaders believe current steelmaking scrap price levels, highest since 1917, are about at the top of recent uptrend. Those who are willing to hazard a guess state the market probably will remain strong until spring at which time prices may trend downward.

Philadelphia — Scrap shipments are increasing and this is proving to be a life-saver for many mills, confronted with a shortage of pig iron. Despite the fact that some mills are operating largely on a week-to-week basis and are not running at capacity, district ingot output at present is at one of the highest levels since the war. Certain producers, for the first time in recent months, have been able to accumulate a little stock, and at least two consumers of low phos scrap have been holding up on shipments recently.

Prices generally are unchanged, but cast scrap is still buoyant. Two of the larger consumers have refused to go above $41, delivered, and are getting a limited amount at this price. However, in their case they are engaged in work which gives them a priority on pig iron. Consequently, they can, if necessary, get along on a fairly restricted amount. A number of other consumers, however, are not in such a favorable position, and are paying more for cast, in some scattered instances substantially more.

Scrap continues to come out slowly from the War Assets Administration, notwithstanding the fact that a scrap section has been set up for some time. Every effort is made to first dispose of surplus material on a salvageable basis and this is consuming time. Some machinery is now being sold on a scrap basis, but the tonnage involved has not been substantial.

The Philadelphia Navy yard recently disposed of 1000 tons of ferrous scrap at $26.67, yard, to a dealer in Palmyra, Pa., with Bethlehem Steel Co. the next highest bidder at $26.50. The Navy yard also disposed of 300 tons of ferrous scrap, some salvageable, at $31.17 to a dealer in Harrisburg, Pa., with Bethlehem again the second high bidder at $27.50.

Chicago — While prices for steelmaking scrap hold firm, the flow of material to mills little more than meets consumption. District steelmaking operations continue for the second week at 90 per cent of capacity, the highest rate since mid-November when the coal strike interfered. Consequently, consumption of scrap is heavy and would be heavier if scrap supply permitted. Inventories are dangerously low, with the result that steel plants frown upon dipping into them to gain higher operations. Cast grades of scrap continue scarce with prices covering a wide range.

Detroit — Signs of price weakness in both turnings and cast grades have developed in the past week, though not in sufficient degree to justify changes in published quotations. Cast scrap has been moving in from the Southwest to satiate some of the rampant demand here which had pushed price of No. 1 cupola cast up to $40 or more per ton in isolated cases. It is quoted currently at $35-$37.

New York — Scrap brokers, having difficulty fulfilling commitments, are now paying $28 to $28.50 for the melting steel grades, No. 1 busheling and Nos. 1 and 2 bundles. They have advanced the price on No. 3 bundles to $26 to $26.50. They are buying machine shop turnings and mixed boring and turnings at $20.50 to $21 and short shovel turnings at $20.50 to $23. Low phos grades are unchanged,

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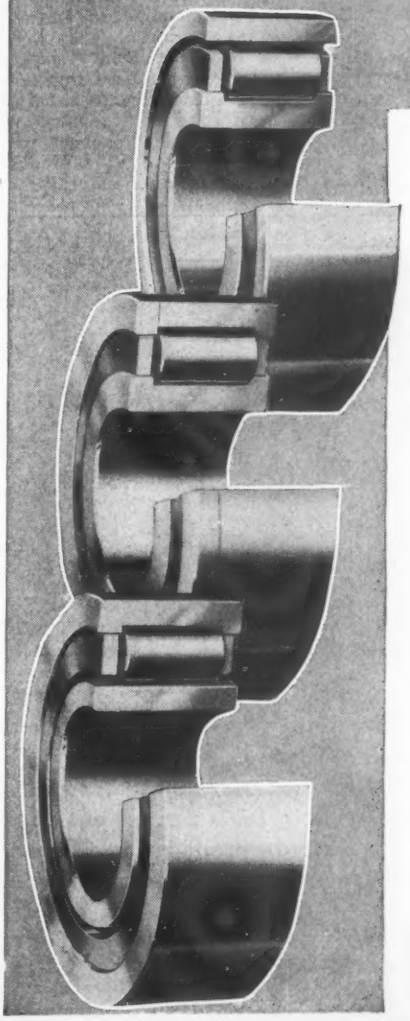

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although No. 1 chemical borings are off slightly to a spread of $25.25 to $25.75. No. 1 cupola cast is now $39.50 to $40, and charging box scrap, $37.50 to $38. Malleable also is higher at $40 to $41. Unusually cold weather recently has slowed up collections, a fact that is contributing to higher prices on some grades.

Boston—Steelmaking grades of scrap are steady but firm, notably machine shop and short shoveling turnings. Prices for cast grades are erratic. Up to $44, shipping point, is being paid for No. 1 cupola cast, although there is a spread down to $42. Pig iron supply has not improved sufficiently to materially affect cast grades. There are numerous melters still short of scrap. Industrial scrap movement is steadier and is slightly heavier. Offers of tie-in sales for steel are more frequently referred to consumers' regular brokers.

Buffalo—Stronger undercurrents dominated a confused scrap market last week. Sales of No. 2 heavy melting steel were reported as high as $32 a ton, a jump of $3 from a week ago. However, there was some dispute over the advanced figure as other dealers reported doing business around $30. With operations threatened by the scrap shortage, mills are making urgent appeals for scrap. Dealers in some instances are cagey in concealing from the rest of the trade full details on recent sales. Consumers also challenge the outside figure in the $35-40 range on No. 1 cupola scrap. It is claimed that virtually all of the business in cast has been near the lower figure. Although cold weather and snow have returned, the preceding period of open weather and mild temperatures brought out increased offerings.

Cleveland — Prices remained steady here last week with shipments somewhat lighter due mainly to inclement weather. Chesapeake & Ohio, Nickel Plate and Pere Marquette railroads have announced that effective with January sales orders for iron and steel scrap, and to continue until further notice, they will sell on the basis of $32 per gross ton for heavy melting steel and at levels $11 per gross ton higher than OPA ceiling prices in effect Nov. 10, 1946, for all other grades of iron and steel scrap. The other principal railroad seller in this district is also holding at about the same levels, although the February list of specialties will be offered on an open competitive basis. Up to the present time, bulk of railroad material here has been allocated to the mills. Consumers have paid recently $32 for No. 1 heavy melting, $45 for railroad malleable, $35 to $36 for rerolling rails, $38 to $39 for random length rails, $39 for cut rails, an average of about $30.50 for couplers, knuckles, railroad leaf springs, etc.; and $36.50 for uncut tires.

Seattle—Steel scrap is arriving in just sufficient volume to enable mills to maintain close to capacity operations. Increased prices have failed to stimulate shipments as expected but with better weather it is believed country shippers will show more interest. Cast iron scrap is also extremely critical. Mills anticipate that the ship breaking industry will partly solve the problem as new yards get into full production. Bids for the sale of additional government ships are out and this source will help to alleviate the shortage. WAA has approved a two-year lease of the Commercial Iron Works' facilities, Portland, Oreg., to the Zidell Ship Dismantling Co. This firm has several surplus aircraft carriers for immediate disposition.

Warehouse . . .

Warehouse Prices, Page 128

Pittsburgh — Distributors' prices for cold-rolled carbon strip and alloy items have not yet been advanced to offset recent increases put into effect by mills. Some action is expected soon clarifying warehouse shape and plate prices. Jones & Laughlin Steel Corp.'s warehouse price on shapes is 25 cents per 100 pounds under the $4.05 city delivery price established by Joseph T. Ryerson & Sons Inc. and U. S. Steel Supply Co.; 35 cents below the $4.30 price for plain plates; and 15 cents under the $5.55 price for floor plates. Other questions up for discussion by steel distributors are whether or not they will pass along the mill extras on quantity lists and for cutting to dead lengths. In most instances distributors are revising specifications to avoid these mill extras.

Boston—Revisions in orders on mills, directed mainly toward elimination or reduction of extras where possible, is the forerunner of greater pressure on new extras once better balance is reached between supply and demand. In a few heavier carbon products and alloys, this balance is not far off, but appears several months away on many lighter items, including flat-rolled, plates and small bars. Demand centers heavily in these; distributors are unable to fill but part of inquiry and on whole are taking in less steel than last quarter. Most warehouses are also unable to place firm tonnage on mills to the extent desired.

Philadelphia — District jobbers report excellent business for the month now closing, with one large distributor so far about 20 per cent ahead of the corresponding period in December. Mill receipts generally have been larger, accounting for the improvement at various warehouses. Meanwhile, jobbers are still working on the completion of new price schedules, quoting only interim prices on some products until the existing confusion regarding the application of certain mills' extras has been clarified.

Cincinnati — Steel jobbers are hard pressed to meet most urgent demand with some customers futilely trying to acquire stocks before the price advances. Shipments from mills have shown slight, if any, improvement this month and warehouse stocks continue badly out of balance.

Chicago — Steel consumers are becoming adjusted to the higher warehouse prices announced recently. Judging by volume of business reaching distributors the higher prices are not operating to reduce demands. While stocks are better than they were recently, they remain unbalanced and material flows to customers about as rapidly as received. Flat-rolled products are in poorest condition. Small size carbon bars and light structurals are particularly tight. Alloy materials are available in adequate supply.

Seattle—Jobbers report a steady demand for all steel items, receipts going directly to the job, as a rule. Thus, inventories continue low.

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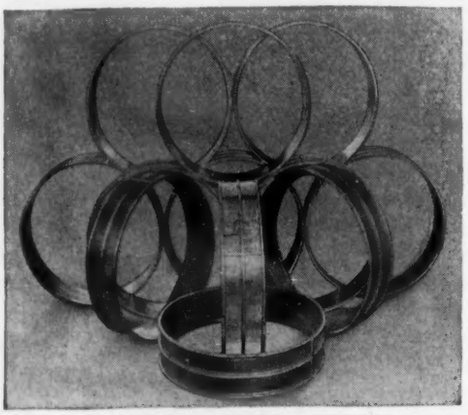

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Premium Price Plan for Copper, Lead and Zinc Revised . . . Silver Price Drops Further

Nonferrous Prices, Page 131

New York — Operations of the Premium Price Plan for copper, lead and zinc have been reorganized under the direction of Commissioner Harold Stein, Office of War Mobilization & Reconversion of the Office of Temporary Controls. Clarence O. Mittendorf, formerly head mining engineer of OPA, has been appointed director of the Premium Price Plan. Staffs of the CPA and OPA which have been working on the program have been consolidated as a single unit in the OWMR.

Inter-Agency Quota Committee, which formerly passed upon applications from mine operators for premium payments, has been abolished. Director of the plan will recommend assignment of new quotas and revisions in existing quotas to the Review Board composed of representatives of the CPA, RFC, and OPA.

In another governmental action, controls over purchase of lead alloy and scrap and tin alloy and scrap containing 50 per cent or more by weight of the basic metal from the RFC have been relaxed. No CPA authorization is now needed for the purchase of these materials and restrictions are no longer imposed as to who may purchase them, except that end-use restriction imposed by CPA's tin order, M-43, are still in effect on tin-bearing material.

At the same time, CPA has added metallic nickel and zinc oxide to the list of items whose purchase from RFC is subject to certain controls. Sales of zinc oxide will be authorized only in cases of emergency. These actions were taken through changes in table A of priorities regulation 34.

Office of International Trade, Department of Commerce, has added aluminum sheets, plates and strip to the list of commodities under export control. This step was taken to conserve available supplies of these goods to meet the demands of the veterans' emergency housing program.

A rise in ceiling prices on base metals is expected to be announced soon in Ottawa, Canada, by the Wartime Prices & Trade Board. Barring unforeseen developments, it is unofficially reported that copper will be lifted to about 16.20c from 11.50c; lead, to a little more than 10.00c from 5.00c; antimonial lead, to more than 12.00c from 7.50c. This would bring the Canadian price levels closer to those in the United States.

Tin — British Ministry of Supply's buying prices for Malayan and Nigerian tin will remain unchanged until further notice. The price for Malayan tin holds at £370 a long ton at smelter works in Penang and Singapore. Nigerian price will remain at £375 10s a long ton for tin in ore at Nigerian ports.

Combined Tin Committee has recommended a 50 per cent reduction in international tin allocations for the first half of 1947 compared with the last half of 1946, pending further figures on supply. Allocations would be increased later when the supply picture is clearer. The United States share is tentatively set at 3640 long tons.

Silver — Domestic users have been on a "buyers strike" for several weeks, forcing the price to 70.75c an ounce, the lowest level since June 28, 1946, and comparing with 90.12½c which held during the second half of last year until Dec. 5 when the current downtrend got under way. Silversmiths, jewelry makers, film manufacturers and other silver consumers have almost halted purchases of the metal in the past few weeks. They maintained that the price was too high and have been scouring their plants for scrap metal to be re-used. Recent sales in New York of about 1 million ounces of foreign silver to British interests and the sale of 1,800,000 ounces of the metal for minting into foreign coins has not served to offset the buying lull of American consumers.

The market has been unsettled recently also by the fact that several million ounces of silver are on the way from China for remelting and refining, although it may not be offered to American users.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 127

New York—Bolt and nut makers report little headway in reducing their backlogs. In fact, most producers still have backlogs averaging around six months. Special demand prevails for carriage and machine bolts, ½ by 6 inches and smaller, and for stove bolts. Certain producers are no longer accepting orders in these lines.

Demand continues highly diversified and in addition includes heavy foreign requirements. The Philippines and India and certain other points in Far East are pressing for tonnage; in South America, Argentina is particularly active. However, there is growing competition in the South American counries from England and Belgium and some American producers believe that it behooves them to pay greater attention to the South American countries if they are to establish sound long-term relationships.

Bolt and nut makers are having continued difficulty getting wire rods and carbon bars in the 8-inch mill sizes.

Manganese Ore . . .

New York — Manganese ore prices are slightly stronger. While the official quotation of the Office of Metals Reserve continues to hold at 85 cents per gross ton unit, dry, 48 per cent, New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, including duty, outside shipments direct to consumers are 15 cents per unit less, as compared with a spread of 15 cents to 17 cents recently.

A stronger tone reflects high rate of consumption over recent months, combined with somewhat restricted shipments from abroad.

Except for high grade metallurgical ore, prices on chrome ore generally have declined recently. This applies to Transvaal, Rhodesian and Indian ore, and also

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to such Russian and Turkish ores as are now being received. Little or no Brazilian ore is now coming into this country; nor is any expected for at least several months, as the ore mined there is said to be going into Brazil's expanding steel industry.

Rails, Cars . . .

Track Material Prices, Page 127

New York—A task group, comprising representatives of five car builders and two railroads with company shops, was appointed recently as a result of a meeting in Washington to work in cooperation with a similar task force, comprising certain members of the Steel Products Advisory Committee of the Civilian Production Administration, yet to be announced, in channeling steel for the production and repair of domestic freight cars.

The car builders task group is comprised of representatives of the Pullman-Standard Car Mfg. Co., Chicago; General American Transportation Corp., Chicago; Pressed Steel Car Co., Pittsburgh; Greenville Steel Car Co., Greenville, Pa.; and the American Car & Foundry Co., New York; and of the Chicago Burlington & Quincy and the Chicago Milwaukee St. Paul & Mississippi. At the original meeting in Washington, Jan. 16, all car builders were represented, along with 13 railroads.

At recent meetings in Washington held to discuss the shortage in domestic freight cars, it was pointed out that approximately 117,000 freight cars, including 82,000 for domestic carriers were on order, but that the average freight car deficit has risen approximately 5000 cars within a year to 28,390 late last December. Government officials are urging that monthly car production be increased to 10,000 cars, which is almost double the average monthly production last year. Sellers of car steel doubt that they can supply a sufficient amount of rolled steel to insure production at present of anything like that total. However, an effort is going to be made to step up shipments of car steel as much as possible, with the probability that fairly good strides will be made in the second quarter. Ten thousand freight cars, it is pointed out, would require about 210,000 tons of steel per month, or well over the 100,000 tons consumed for the construction of cars per month over the past several months.

Incidentally, total car capacity of the commercial shops is estimated at around 14,000 cars per month.

Cleveland — Chesapeake & Ohio Railway has awarded a contract for 1000 fifty-ton lightweight all-steel box cars to Pullman Car Mfg. Co. while Nickel Plate has awarded a like contract for 600 of these cars. The cars, to be built of welded high-tensile low-alloy steel and equipped with high-speed trucks, will cost about $6,300,000.

In inviting bids, the roads departed from the customary practice of making their own specifications. This gave car builders an opportunity to use their own ingenuity in designing the cars.

Tool Steels . . .

Pittsburgh — In addition to upward revision in price base for tool steels announced recently, producers have established the following major revisions in applicable extras. The base quantity has been changed from 1000 to 2000 pounds for both high speed and tool steels; a minimum charge of $2 per ton has been inaugurated. Shape extras are now applicable to octagons, quarter octagons and hexagons. Size extras for cold-drawing high speed and tool steel flats now include the hot-rolled size extra which was formerly carried as a separate item.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 127

Boston — Supply of reinforcing bars is improving. Fabricators and distributors are more sure of quotas, but beyond this, volume is uncertain. This continues as a brake on forward commitments involving larger tonnages, but higher mill prices and consequently better margins, is showing up in higher production.

Chicago—Volume of reinforcing steel business in this district is extremely low, a condition arising partly from seasonal construction conditions, but mostly from shortage of steel. There are few indications that revival will be appreciable before spring.

Great Lakes Steel Revises NAX Steel Price Schedule

Great Lakes Steel Corp. is now quoting high-strength low-alloy steels as follows: Hot-rolled sheets, 3.75c; hot-rolled strip, 3.75c; cold-rolled sheets, 4.55c; cold-rolled strip, 4.55c, Pittsburgh, 4.65c, Chicago and Gary; hot-rolled bars, 4.00c; plates, 4.10c.

Canada . . .

Toronto, Ont. — Despite advancing iron and steel prices in the United States and the lifting of price ceilings on many lines of consumer goods, no action has been taken toward increasing ceiling prices on iron, steel, and scrap in Canada. However, some items in the steel group soon may be permitted a price boost but so far no official pronouncement in this direction has been forthcoming.

Production of iron and steel has returned to the average of the first half of 1946, but producers see little prospect of bringing a balance between supply and demand before the end of this year. In fact, they point out that most shipments now being made are a carryover of orders from the early part of last year, and with new bookings closed at the end of December they have no surplus capacity remaining to the end of June. Although iron and steel deliveries to consuming plants have been stepped-up, there has been little or no actual easing in the supply situation and most consumers are depending on spot deliveries to maintain production schedules.

Canadian sheet mills are operating to the limit of their steel supply, but continue to fall behind in meeting do-

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mestic demand. Mills are out of the market for new sheet business and are not expected to take on further orders before the end of May. While plate mills are not as heavily booked as are sheet mills, demand for plate is expanding rapidly and large tonnage orders are pending.

Heavy demand for carbon steel bars is reported and while some barmakers are out of the market others are taking on additional business in the hope of making delivery before the end of the first half. Consumers report difficulty in obtaining additional tonnages of bars although the majority are obtaining enough to maintain operations on reduced schedules. Demand for alloy bars is picking up slowly, but there is not the same rush for supplies as in carbon bars.

New construction projects are still held up due to steel shortage, but it is reported larger tonnages of heavy structural shapes are coming into Canada from the United States.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3300 tons, five hangars, Gravelly Point, Va., through the Dyker Building Co., to the American Bridge Co., Pittsburgh.

775 tons, diesel plant for Pennsylvania railroad at Harrisburg, Pa., to Belmont Iron Works, Eddystone, Pa.

575 tons, boiler plant, Long Island Lighting Co., Port Jefferson, Long Island, to the Harris Structural Steel Co., New York.

385 tons, First National Store building, East Hartford, Conn., through Wadhams & May Co., to Topper & Griggs, representing Bethlehem Fabricators, Bethlehem, Pa.

225 tons, substation, Consolidated Edison Co., Ravenswood, N. Y., to the Grand Iron Works, Bronx, New York City.

100 tons, building, for RCC Co., Paramus, N. J., to the Altmer Iron Works, Jersey City, N. J.

100 tons, wire drawing plant building, General Electric Co., Bridgeport, Conn., to Connecticut Steel Co., New Haven, through Gellantly Construction Co., Bridgeport.

Unstated tonnage, foundry building, Warwick Co., Warwick, R. I., to A. O. Wilson Structural Co., Cambridge, Mass., through Gilbane Construction Co., Providence, R. I.

STRUCTURAL STEEL PENDING

6000 tons, Connecticut state bridge, Old Lyme and Old Saybrook: American Bridge Co., Pittsburgh, low bidder.

2000 tons, Bascule bridge, Route S3, over Passaic River, between Clifton and Rutherford, N. J., for state highway department; bids to be closed Feb. 13.

500 tons, carbon steel angles, Wright Field, Dayton, O.; bids in Jan. 23, inv. 256.

430 tons, Narrows dam and power plant, Pike county, Arkansas; bids March 11, U. S. engineer, Vicksburg, Miss.; also 300 tons penstock and conduit linings, and 125 tons, miscellaneous metal work.

350 tons, addition, Public School No. 92, Brooklyn; bids asked.

Unnamed tonnage, superstructure, truck terminal, New York Port Authority, lower Manhattan, New York City, bids expected to be asked in the spring; bids on foundation work to be asked in February.

Unstated, roof and framing, machine shop, Grand Coulee, Wash.; Worden-Allen Co., Milwaukee, low, $27,000.

Unstated, hollow metal doors, Coulee project; Siems Bros., St. Paul, low, $47,551.

Unstated, machine shop roof, Bureau of Reclamation, Denver; Truscon Steel Co., Youngstown, O., low, $7000.

Unstated, two emergency gates and hoists for Pasco, Wash., pump plant; bids to Bureau of Reclamation, Denver, Feb. 18.

Unstated, 5-ton traveling crane with clam shell bucket; bids to Spokane, Wash., Jan. 30.

Unstated, 128-foot steel girder bridge, Skagit county, Washington; bids to Olympia, Feb. 4.

Unstated tonnage, structural steel cofferdam, Central Valley project, Bureau of Reclamation, Denver; American Bridge Co. Low, $171,855 fob Denver, spec. 1571; American Bridge Co. awarded contracts on spec. 1571 and 1535 at $8288 and $17,117 respectively.

REINFORCING BARS . . .

REINFORCING BARS PENDING

625 tons, Narrows dam and power plant, Pike county, Arkansas; bids March 11, U. S. engineer, Vicksburg, Miss.

300 tons, superstructure high-level deck plate girder bridge, Connecticut river, Old Lyme-Saybrook, Conn.; also 615 tons, bearing pile one alternate and 1715 tons, second alternate, Merritt-Chapman & Scott, New York, low.

300 tons, hospital addition, Yakima, Wash.; Hall-Atwater Co., Seattle, low, $397,612.

140 tons, Bureau of Reclamation projects; bids to Denver, Jan. 21.

100 tons, Washington state highway jobs; bids to Olympia, Feb. 4.

Unstated, Oregon state highway jobs; bids to Portland, Oreg., Feb. 3.

Unstated, three concrete reservoirs, Home water district, Portland, Oreg.; bids in.

PLATES . . .

PLATES PENDING

1100 tons, structural steel plates, Wright Field, Dayton, O.; also 400 tons of galvanized sheets and 450 tons of low-carbon steel; bids in Jan. 23, inv. 256.

300 tons, eight propane tanks, Decatur, Ill., for Illinois Power Co.

120 tons, electrical engineering building, Urbana, Ill., for University of Illinois; bids Jan. 21.

40 tons, boiler installation, Washington state Steilacoom hospital; Puget Sound Machinery Depot, Seattle, low $48,060.

Unstated, 300 feet, 72-in. steel, alternate concrete, siphon, Yelm, Wash., irrigation district; award to J. A. Tertling & Sons, Centralia, Wash.

PIPE . . .

CAST IRON PIPE PENDING

750 tons, various sizes, Spokane, Wash.; bids in Jan. 23.

Unstated, 4 to 12-in. beel and spigot, also valve boxes and other fittings; bids to Spokane, Wash., Jan. 30.

Unstated, 4-in. cast iron water pipe; bids to Alderwood Manor, Wash., Jan. 27.

Unstated, water system state custodial school, Buckley, Wash.; M. Malaspina, Seattle, low, $257,423.

Unstated, cast iron pipe and fittings, two turbine pumps, etc.; bids to Pullman, Wash., Jan. 31.

RAILS, CARS . . .

RAILROAD CARS PLACED

Chesapeake & Ohio and Nickel Plate railroads, 1600 fifty-ton lightweight all-steel box cars, to Pullman Standard Car Mfg. Co.

RAILROAD CARS PENDING

Baltimore & Ohio, 1000 fifty-ton hoppers.

Wheeling & Lake Erie, 1000 70-ton triple-bottom hoppers.

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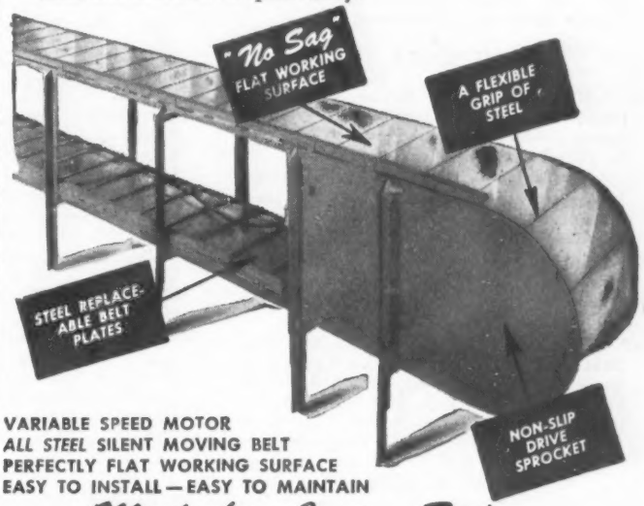

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CONSTRUCTION AND ENTERPRISE

CALIFORNIA

ALAMEDA, CALIF.—Gray Mfg. Co. has been organized with $50,000 capital to manufacture steel truck bodies, by Stanley D. Whitney, Bank of America Bldg.

LOS ANGELES—Turnbull Metal Products Co. has been formed with $75,000 capital to engage in the steel jobbing and metal products business, by Glenn Behymer, 1215 Rives-Strong Bldg.

RICHMOND, CALIF.—Rheem Mfg. Co., San Francisco, R. S. Rheem, president, has acquired a 36-acre tract near its local plant, as a site for possible future expansion.

DELAWARE

WILMINGTON, DEL.—Hercules Powder Co., Delaware Trust Bldg., has awarded contract for high test laboratory to J. E. Healy & Sons, 707 Tatnall St., for $56,000.

MASSACHUSETTS

WORCESTER, MASS.—United Steel Products Inc., 119 Grove St., has begun construction of 1-story plant on Southbridge St. Slitting and shearing equipment as well as facilities for production of cold-rolled flat wire and hot-rolled bars will be installed.

MISSISSIPPI

BILOXI, MISS.—Hicks Battery Mfg. Co., Columbus, Ga., has selected site on Back Bay to be used as location for manufacturing plant. I. Daniel Gehr, Biloxi, architect.

GREENVILLE, MISS. — Tennessee Gas & Transmission Co., Commerce Bldg., Houston, Tex., has awarded contract for 23 mile, 26-in. natural gas pipeline loop near Greenville to Morrison Bros. Construction Co., for $1,240,000.

HAZLEHURST, MISS.—Central Construction Co. Inc., Philadelphia, Miss., has awarded the following subcontracts for construction of factory building for city: Roof and sheet metal, Clark-Burt Roofing Co., Jackson, Miss.; structural steel, Decatur Iron & Steel Co., Decatur, Ala.; steel sash, Michael Flynn Mfg. Co., Philadelphia; reinforcing steel, Virginia Steel Co., Birmingham.

MISSOURI

ST. LOUIS—H & S Time Service Inc., 902 N. Grand Blvd., has been incorporated to manufacture automatic time machinery and devices, by Alfred Hirschfield and associates.

ST. LOUIS—Charles G. Kruckemeyer Machine & Parts Co., 1365 Cockrill St., has been formed to manufacture and repair machinery, by Charles G. Kruckemeyer, Jennings, Mo.

ST. LOUIS—Combustion Engineering Co., 5319 Shreve Ave., has awarded contract to Fruin-Colnon Contracting Co., 1706 Olive St., for 1-story storage building.

ST. LOUIS—C. Hager & Son Hinge Mfg. Co., 3451 DeKalb St., has awarded contract to Fruin-Colnon Contracting Co., 1706 Olive St., for 1-story factory, 133 Victor St., to cost $200,000. Mauran, Russell, Crowell & Mallgardt, Chemical Bldg., architects.

NEW JERSEY

BOUND BROOK, N. J.—Johns-Manville Corp., New York, has begun construction of the second and main unit of its research center. The first unit, a 572 x 135-ft plant and water filtration and waste processing building is nearing completion. The second unit consists of a 3-story, 350 x 67-ft research building and a 288 x 100-ft mechanical and service building.

NORTH CAROLINA

CHARLOTTE, N. C.—Cotton Mill Machinery Co. has been incorporated with $200,000 capital stock to manufacture machinery, by John E. Hamilton and associates.

GREENSBORO, N. C.—Richard K. Hunter & Co. has been incorporated with $100,000 capital stock to manufacture machinery, equipment and supplies, by Richard K. Hunter and associates.

OHIO

AKRON—Wilkinson Chutes Inc. has been formed with 1000 shares of no par value to manufacture and erect chutes, conveyors, etc., by Janet C. and C. M. Wilkinson and John G. Rowley.

BEDFORD, O.—Ferro Chemical Corp., Northfield and Forbes Rds., plans construction of factory addition to cost about $61,240.

CANTON, O.—Cramer Mfg. Co., formerly Cramer Sheet Metal Co., 5110 Westfield Ave. NW, has been incorporated with $50,000 capital, by Ronald A. Cramer, Albert B. Arbaugh and E. Robert Schellhase. The company makes and installs air conditioning ducts, metal pipes and fittings and converter hoods for conversion gas burners.

CLEVELAND—Hamilton Steel Co., E. 131st St. and Taft Ave., plans erection of steel warehouse to cost $23,000.

CLEVELAND—Beal Bros. Inc. has been formed with $75,000 capital to manufacture tools and other metal products, by Ralph W. Beal, 2372 Noble Rd.

CLEVELAND—Cleveland Cap Screw Co., E. 79th St., has under way an expansion program costing around $350,000 which will include a 1-story addition containing 20,000 sq ft. It will purchase new machinery costing about $250,000.

KENT, O.—Lamson & Sessions Co., 800 Mogodore Rd., Frank Dangler, manager, contemplates erecting new machinery to increase the plant's productive capacity.

SANDUSKY, O.—Hinde & Dauch Paper Co., Sidney Frohman, president, is planning a $4 million expansion program which will include addition of 162,000 sq ft of manufacturing space. A considerable portion of the project's cost will go for new machinery.

STEUBENVILLE, O.—Wheeling Steel Corp., South Third St., has purchased four acres of land along the Ohio river between South and Market Sts., which it will use in its expansion program.

SOUTH CAROLINA

CHARLESTON, S. C.—Steelsec Inc., E. E. Boegli, president, has been formed to produce steel fabricated homes and expects to begin production in April. The company, with 64,000 sq ft of space in Warehouse F, Port Terminal, plans to spend $100,000 for equipment and machinery.

COLUMBIA, S. C.—South Carolina Power Co., Charleston, S. C., J. F. Crist, vice president, is planning a $9 million improvement program.

ROCK HILL, S. C.—Celanese Corp., of America, 180 Madison Ave., New York, has awarded contract for construction of plant to Daniel Construction Co., P. O. Box 2087, Greenville, S. C., for an estimated $30 million.

TEXAS

BEAUMONT, TEX.—Gulf States Utilities Co., Roy Nelson, president, plans expenditure of $20 million over a two-year period for large transmission facilities and improvements.

DALLAS, TEX.—Cedergren Metals Co., H. N. Cedergren, has begun construction of addition to present building at 2101 W. Commerce St. Owner is building.

FREER, TEX.—Freer Iron Works has abandoned project for plant expansion and improvement to have cost $74,000.

HOUSTON, TEX.—Aluminum Products Co., 2314 Main St., contemplates construction of factory, to cost $200,000.

HOUSTON, TEX. — Rohm & Haas, 222 W. Washington Square, Philadelphia, asked for bids Jan. 15 for chemical plant to cost $3 million and warehouse to cost $250,000.

HOUSTON, TEX.—Earl McMillian Co., Earl McMillian, president, plans construction of 80 x 200-ft factory for rebuilding automobile engines and other auto parts. Cost will be approximately $300,000.

LIBERTY, TEX.—Texas Gulf Sulphur Co. has awarded contracts for construction of $2 million sulphur plant, to include office buildings, machine shops, power plant and other buildings, to be located about 16 miles south of here.

MINERAL WELLS, TEX. — Cannelton Sewer Pipe Co., Edward F. Clements, president, Cannelton, Ind., has awarded contract to J. Alton Murphey for construction of Texas Vitrified Pipe Co. plant on 63-acre site. Allied Engineering Co., Cleveland, engineer.

TEXAS CITY, TEX.—Carbide & Carbon Chemicals Co. received CPA approval for 2-story addition to office building, to cost $96,800.

WINNIE, TEX.—McCarthy Chemical Co., Glenn H. McCarthy, president, plans construction of chemical plant near here, the first unit of which will cost more than $3 million. Plant will produce unsaturated hydrocarbon chemicals.

VIRGINIA

CHESTERFIELD, VA.—E. I. du Pont de Nemours & Co., Wilmington, Del., has obtained CPA approval for addition to boiler house at nearby cellophane plant, to cost $85,460.

NORFOLK, VA.—United States Gypsum Co. has acquired a 57-acre tract on the southern branch of the Elizabeth River, on which it plans construction of plant to manufacture gypsum board.

QUANTICO, VA.—Virginia Electric & Power Co., Seventh and Franklin Sts., Richmond, Va., has awarded contract for design and construction of power plant on Potomac river near here to Stone & Webster Engineering Corp., 90 Broad St., New York, for an estimated $7,500,000.

WASHINGTON

EVERETT, WASH.—Sumner Iron Works recently suffered an explosion which caused severe damage to its generator building. Structure will be rebuilt.

PORT ANGELES, WASH. — Robert W. Forrest has obtained CPA approval for installation of marine railway including repair plant and machine shop to be erected on land leased from Port of Port Angeles.

YAKIMA, WASH. — John Deere-Lindmann Power Equipment Co.'s local plant recently suffered damages estimated at $100,000 as a result of fire.

WISCONSIN

MILWAUKEE—Major Die & Tool Co. has been organized with 1000 shares of no par value common stock and 1000 shares of $100 par value preferred stock to manufacture tools, dies and appliances, by Rudolph Goldschmid, Nathan Ruppa and Kathleen Szopinski.

REEDSBURG, WIS.—Reedsburg Foundry Co., newly formed with $100.000 capital, has begun construction of an 80 x 310-ft foundry building to be used in production of gray iron and aluminum castings.

WEST ALLIS, WIS.—Allis-Chalmers Mfg. Co., 1126 S. 70th St., has awarded contract for alterations and additions to Foundry 1 to Siesel Construction Co., 514 E. Ogden Ave., Milwaukee, for estimated $70,000. C. E. Meyers, c/o owner, architect.

WYOMING

WAMSUTTER, WYO.—Stanolind Pipe Line Co., c/o B. C. Clardy, president, Stanolind Bldg., Tulsa, Okla., plans construction of approximately 480 miles of 12-in. screw joint crude oil pipeline between Wamsutter and Rangely, Colo., to cost about $18 million.

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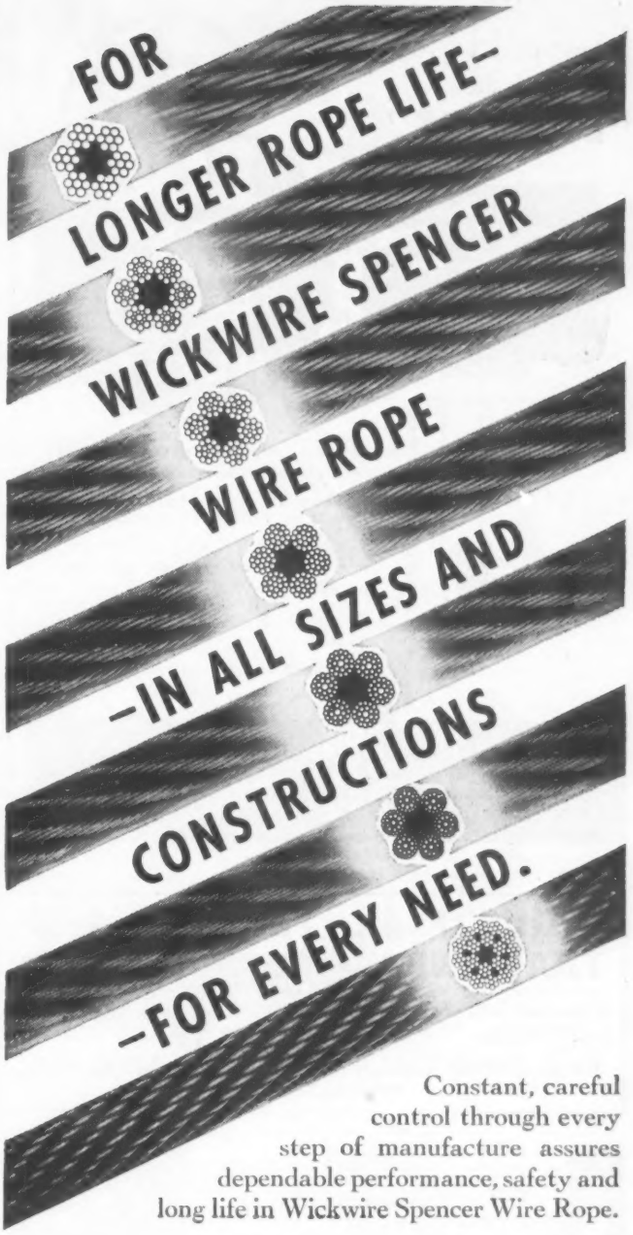

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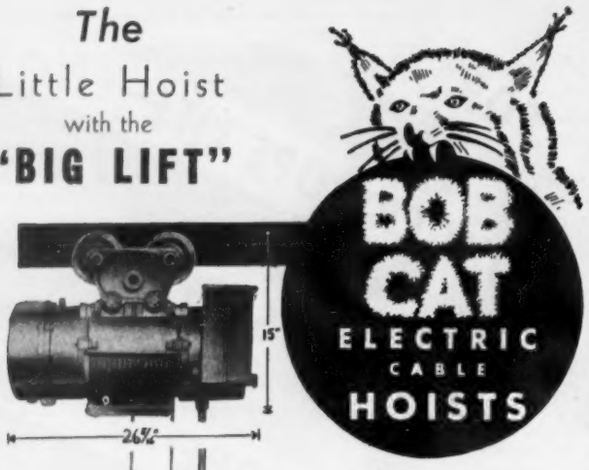

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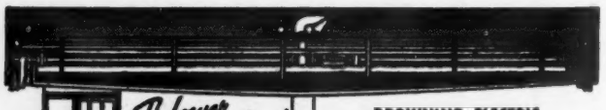

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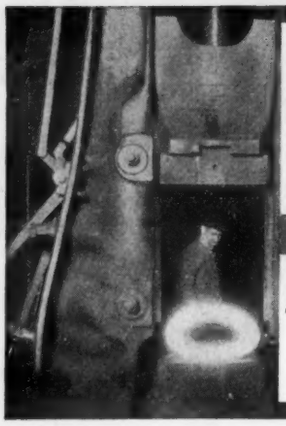
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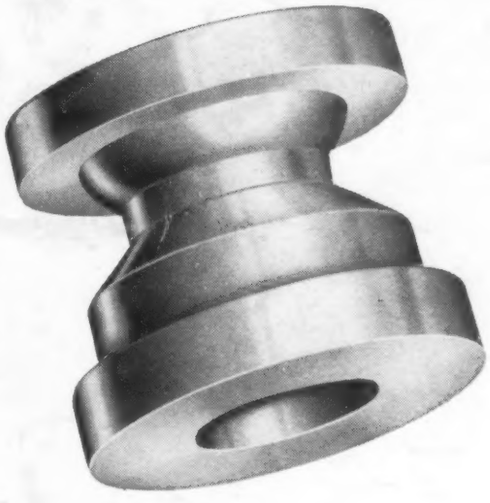

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